AMERICAN RED CROSS ABRIDGED TEXT-BOOK

ON

FIRST AID

WOMAN'S EDITION

A MANUAL OF INSTRUCTION

BY

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Prepared and Endorsed by the American Red Cross

WITH ILLUSTRATIONS

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PREFACE

WOMAN'S EDITION

The experience of the American Red Cross in teaching first aid to the injured since its first manual on this subject was published in 1908 has shown that it would be highly desirable to have a special edition for women. The present edition has, therefore, been prepared to meet their needs.

It should be explained further that the experience of the First Aid Department of the American Red Cross has been that certain knowledge of first aid is necessary to every student of the subject, and the plan adopted for its various manuals has been to publish the information essential to all in chapters which correspond in each edition. In other chapters is found the special information which is only of value to the special class for which the edition was prepared.

Notwithstanding the lack of an instruction book wholly adapted to their needs, many hundred women have already received first-aid instruction under Red Cross auspices and with the very best results. A mass of testimony to this effect has been voluntarily offered from many different sources. It is hoped that the present manual will, as far as may be, result not only in many more women studying first aid to the injured but also in giving women students of the subject better practical knowledge than has hitherto been available to them in a book.

Of course, it is realized that a good teacher is more valuable than any book can ever be. All that a book on first aid can do is to gather together the information which has proved most valuable in the experience of teachers and in actual practice.

It is desired to take advantage of this occasion to express the

thanks of the author to the many physicians throughout the country whose advice and assistance are embodied in this little manual. The thanks of the American Red Cross are also due to the many physicians who have served as first-aid instructors, to the organizers of classes and to others who have assisted in various ways in the dissemination of knowledge of first aid to the injured.

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AMERICAN RED CROSS ABRIDGED TEXT-BOOK ON FIRST AID

WOMAN'S EDITION

CHAPTER I

WHAT FIRST AID TO THE INJURED IS; GENERAL DIRECTIONS FOR GIVING FIRST AID; SHOCK

What First Aid to the Injured Is

We all know, of course, that a doctor as he has given years to studying the subject is best qualified to take care of ill and injured. On the other hand, accidents and sudden illness often occur where the services of physicians cannot be immediately obtained. The necessary delay may result very disastrously for the ill or injured. A very large experience has shown that any intelligent person can learn what to do in such emergencies. First aid to the injured must be learned, however, like every other subject and no one will know what to do for ill or injured unless he has studied it. But all that is necessary for good results is that the student have common sense and devote the small amount of time required for acquiring the special knowledge and skill.

Knowledge of first aid to the injured is a very valuable and very cheap form of insurance. Possibly we may never need this knowledge, but the wise man or woman would hardly be willing to let any building go without insurance on the chance that it would never burn. How much more important it is for us to

insure our own selves against the bad results of accidents through knowledge of first aid to the injured.

There is no clashing of interest between the doctor and the first aider. The duties of the former begin when the latter leave off. Knowledge of first aid enables trained persons to put patients into doctors' hands in the best possible condition for cure. It should also enable them to recognize the severity of an injury or illness so that when necessary they may call a doctor promptly. Treatment, except of very minor cases of injury or illness and the care of injured and ill in an emergency till a doctor can be procured is not first aid. Such treatment cannot be learned from this book, and cannot be too strongly condemned.

Accidents have become far too common and the attention of every student of first aid is earnestly invited to the great benefits to be gained by studying how to prevent them as part of his or her course in first aid. Prevention is better than cure in injury as well as in disease and is just as practical. In both, good results in this respect are mainly dependent on the action of individuals. Every injury described in this book should suggest how the accident which caused it might have been prevented. Still more if any first aider cares for a real injury he or she should think over the cause for it carefully and so far as within their power take steps to prevent a similar accident in the future.

General Directions for Giving First Aid

If no doctor is present when an accident occurs someone must take charge of things. This duty naturally falls on the first aider. This is what he has studied first aid for and he should always stand ready to take the responsibility. In justice to the injured person and to himself he must not allow interference by other people. The only people who should be near an injured person are those required to help him. He needs all the air he can get and a crowd about him will use air that he should have.

Be observant. Everything depends upon this. See every-

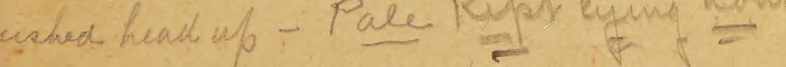
thing and think what each thing means. Then you can hardly go wrong in caring for the patient.

Be calm and don't be hurried. Be quiet and cool.

If a doctor is within immediate call it may hardly be necessary for the first aider to do more than to send for the doctor and to keep the crowd away from the injured person. The action taken depends on the injury, however; for example, it would be very foolish to wait a moment for a doctor if there were danger of death from bleeding or in any accident where delay would be dangerous. On the other hand, often it may be better to have a doctor care for the injury from the first. In giving first aid it is quite as necessary to know what *not* to do as what to do. In any case if the services of a doctor can be had it is always best to employ them, except for slight injuries. Moreover, if any doubt exists in regard to this, it is best to send for a physician or to take the injured person to a doctor as soon as possible. It should be remembered that injuries which are apparently trivial may sometimes, if not treated promptly by a doctor, have serious consequences, and that a physician called in time may prevent conditions which when fully established are beyond the help of medical science.

Tight clothing interferes with both breathing and circulation. The collar should be loosened at once, and also usually the belt, likewise anything else around the body which is tight.

Generally speaking, if something special does not need immediate attention, the next thing to do is to get the injured person into a safe and comfortable position. The best position, unless there is some reason to the contrary, is on the back with the head low. With a flushed face, the head may be raised on a small pillow or folded coat; with a pale face, it should not be raised at all. If a person is vomiting, he should be placed on his side or his head should be turned to one side, so that the matter vomited will not go into his windpipe and choke him. Unconscious persons cannot swallow and so they should never be given water, stimulants, etc., as these will choke them by entering the windpipe. Slight cases of illness and injury may sit up, but one must be sure that all seriously injured are kept lying down.



Do not be hurried into moving a person from the place where his accident has occurred and always make sure first that he is not going to be injured further by being moved. It is specially dangerous to move persons with broken bones before proper treatment has been given as the ends of the broken bones are very sharp and cut like a knife.

A hurt person will frequently ask for water, which may be given with perfect safety. Cold water is usually more refreshing, but whether cold or hot, it must be given fairly slowly so that the injured person has time to swallow between sips. To neglect giving a stimulant when it is required would be a grave error of judgment. The first thought with many people, however, is to procure whisky or brandy for every sufferer from illness or injury. These are really as unnecessary for every case as would be the application of splints to the leg of every injured man. They should never be given in injuries of the head, and it should be remembered that while a small quantity of liquor acts as a stimulant, large ones are depressing. If you have it, always use aromatic spirits of ammonia as a stimulant in preference to any alcoholic liquor.

Whatever the injury may be, it must be seen clearly before any attempt is made to treat it. In order to do this it will generally be necessary to remove some of the clothing. This is likely to be very painful and possibly dangerous for the injured person, unless he is handled with the greatest gentleness. In removing clothing, rip up the nearest seam in the outer clothing and cut or tear the underclothing. The sound side should be undressed first so that the injured side will be subjected to less movement. In injuries to the foot and ankle it will rarely be possible to remove the boots or shoes without giving severe pain and perhaps doing considerable damage, so they should be cut freely when this is necessary.

The first aider must make use of what he finds on the spot. He must explain clearly to any helpers just what he wants them to do.

When there are several injuries the most severe should be cared for first.

Shock

More or less shock is caused by *all* injuries and it must be thought of, and treated when necessary.

Description.—Shock is a more or less profound depression of the nervous system. It is sometimes called collapse or prostration.

For the convenience of the student the human body is divided into various systems. One of these and perhaps the most important as it regulates the action of all the others is the nervous system. This is a very delicate system which is easily disturbed. Everybody knows what a mental shock is. A person receives bad news, for example, he grows pale, perhaps is unable to move, or even becomes half conscious or totally unconscious and may die. We say he has received a shock. This is exactly what happens as the result of an injury. That is to say, shock always, whatever the cause, is as stated, a more or less severe depression of the nervous system.

Causes.—Usually a severe injury. Some persons are sensitive to shock, however, and so with them more shock will follow a slight injury than is the case with a severe injury in less sensitive persons.

Prevention.—The prevention of accidents, especially severe accidents. Also do not allow an injured person to see his own injury, as this is apt to increase shock. This is especially true with severe bleeding.

Symptoms.—(This is a word whose meaning should be known to every first aider. Symptoms are everything that an injured or ill person shows or feels because of an injury or disease.) Usually appear as soon as an injury is received. Face is pale with an anxious expression; eyelids droop; eyes are dull and the pupils are large. (The pupils are the black circles in the center of the eye.) Skin is cold and covered with a cold sweat. The injured person is more or less stupid and takes no interest in anything happening near him. May be partly or totally unconscious or mind may wander. Usually he lies perfectly quiet and will not move unless disturbed. Breathing is feeble and

shallow. Pulse is rapid and weak. May not be able to feel it at the wrist. (The first aider should be able to count the pulse at the wrist. Seventy-two per minute is the usual rate in perfect health but this varies considerably. Exercise, for example, increases the rate perhaps many beats per minute.)

Usually shock is recovered from, the improvement being gradual but the shock may grow worse and death finally occur.

It might be thought any one should easily know when a person is suffering from shock. This is the case usually but not invariably. If you see the accident and its effect you can hardly make a mistake but suppose you do not see the accident then you may have nothing to judge by except the symptoms just given.

Treatment.—Send for doctor at once if possible. Warm and stimulate in every possible way before arrival of doctor.

First, place injured person on back with head low so that plenty of blood will enter brain.

Stimulants should always be given if he is able to swallow. Hot coffee, hot tea or half a teaspoonful of aromatic spirits of ammonia in a half glass of water. Whisky may be only stimulant procurable. If used, give one large drink only, as more is likely to cause depression. Ammonia or smelling salts to nose, help, when procurable.

Never remove more clothing than necessary from an injured person as this will cause more severe shock, and when possible spread coats or blankets over him.

Place hot-water bottles or hot bricks around him when possible; flannels wrung out in hot water applied to abdomen and chest have the same effect. Rubbing legs and arms toward body, under blankets, quickens circulation of the blood and is useful. Be careful while doing this not to uncover the injured person.

Warning.—While shock is so extremely common in injuries that it should always be kept in mind and treated, it must not be forgotten that something more dangerous even than shock may require attention. The symptoms of severe bleeding are very like shock, and if shock only is treated in such a case and the bleeding is not stopped the patient may bleed to death.

More about Stimulants.—Most first-aid stimulants have already been mentioned but it will perhaps be well to say a few words more respecting their use.

All stimulants taken internally are best given hot when possible as aside from the particular stimulant used, heat itself is a powerful stimulant whether employed internally or externally. Safe and easily procurable stimulants are tea and coffee, a glass of wine, a dessertspoonful of whisky or brandy with an equal quantity of water, or a teaspoonful of pure alcohol with three times the quantity of water (not wood alcohol or denatured alcohol, which are poisons).

Alcohol in some form may usually be easily procured and this use of alcohol is, of course, purely a medicinal one which has nothing to do with the question of the drinking of alcoholic liquors. But many people object to the use of alcohol under any circumstances. In large amounts it is depressing and not stimulating, and for other reasons it is never advisable to carry whisky or brandy for first-aid purposes. Aromatic spirits of ammonia which has none of the disadvantages of alcohol is the best first-aid stimulant. It is best given in half-teaspoonful doses in one-half a glass of hot water.

As unconscious persons cannot swallow, for them we must make use of a stimulant which may be inhaled. The best stimulant under these circumstances is water of ammonia, hartshorn, or smelling salts. This, of course, is held under the nose so its fumes may be breathed in.

Heat employed externally is such a very valuable stimulant that every first-aid student should know how to make use of it. The ordinary hot-water bag is most convenient for this purpose, but glass bottles and jars are good. They should be covered with cloth or paper to prevent them from burning the patient. Hot bricks and stones are also useful. In using heat in this way it must be remembered that, especially with an unconscious person, there is considerable danger of causing severe burns, so one must make sure by testing the bottle, etc., on his arm or face, that it will not burn even if left in contact with the skin for some time. In applying heat by means of the objects mentioned,

to get the greatest effect, they should be placed between the legs, at their outer sides and between the body and the arms. A light hot-water bag lying over the heart acts as a special stimulant to it.

Rubbing not only quickens the circulation, but is also stimulating.

As has been indicated in discussing shock, all the different classes of stimulants are best used together when they can be obtained.

QUESTIONS

1. What is First Aid to the Injured?
2. Suppose you have to care for an injured person. What would you do first.
3. When should you send for a doctor, or take the injured person to a doctor?
4. What about tight clothing?
5. When would you move an injured person?
6. What are the dangers of moving an injured person?
7. What do you know about giving injured persons water; stimulants?
8. Should clothing always be removed?
9. When would you remove some of the clothing and how would you do this?
10. When does shock occur?
11. What is shock? Cause of shock? Prevention? Symptoms? Treatment? What is a symptom?
12. Suppose you see a person whom you think is severely shocked, what would you look for in order to determine nothing more severe than shock had occurred?
13. Explain the use and abuse of stimulants.

PRACTICAL EXERCISES

Have one of the class pretend to be injured, or secure some one else to act as "subject." Members of the class should be required to show just what they would do for any case of injury. They should also be required to loosen and to remove clothing, the place of the injury

having been stated. They should place the injured person in the proper position. The pupil of the eye should be demonstrated and each member of the class should be required to take the pulse.

Show on the subject exactly what should be done in shock.

CHAPTER II

BANDAGES

The first aider must learn to use his hands as well as his head. To know how to bandage well is necessary for him. Practice makes perfect in this as well as in other respects and the first-aid student should learn how to bandage as early as practical in his course of instruction and thereafter take every opportunity to perfect himself by constant practice.

Kinds of Bandages

1. The Triangular Bandage.
2. The Roller Bandage.
3. The Four-tailed Bandage.

1. **Triangular Bandage.**—The triangular bandage is perhaps best suited for general first-aid work, as it can be easily made, is not difficult to apply as a temporary dressing and is not likely to be put on so tightly that it will cause injury by stopping the circulation of the blood.

Some first-aid classes may desire to learn the use of this bandage alone. If so the description of the other kinds of bandages and their use may be omitted. For the reasons stated later, however, it is believed, generally speaking, skill in the application of the other bandages is desirable for the first aider.

The triangular bandage is commonly made from unbleached cotton cloth, though any strong cloth will answer. Bed sheets, pillow cases, napkins and handkerchiefs may all be used to make it.

It is desirable that the piece of cloth for the bandage be not less than 34 to 38 inches square. It is folded diagonally and is cut across in the fold; of course this will give two triangular

bandages. While made triangular bandages may be readily bought, the only advantage they possess is that most of them have pictures showing methods of application stamped upon them.

The triangular bandage may be applied in two ways:

Unfolded.

Folded.

Unfolded means that the bandage is used in the form of the whole triangle.

To fold, the point of the triangle is brought to the middle of the opposite side, and then the bandage is folded lengthwise to the width desired. When folded so as to make a narrow strip the bandage is called a cravat.

2. **Roller Bandage.**—The roller bandage is invaluable for the surgeon but this is not the case with the first aider. The latter must, however, know how to make use of any appliance at hand, and he is very likely in an accident to find it much more convenient to obtain the roller bandage so it is well that he should know the principles of its application.

Roller bandages are usually made of muslin, cotton cloth, flannel, gauze or cheese cloth, and they may be improvised by tearing strips from a sheet and rolling them up. By far the best material is gauze or cheese cloth. This is elastic and fits itself well to the part to be bandaged so that bandages made of it are easy to apply and do not have the disadvantages of inelastic bandages of muslin, which in unskilled hands are very apt either to be pulled so tight on one edge that they cut off the circulation or to be so loose that they will not stay in place.

While roller bandages may usually be readily bought, it is well to know how they should be rolled. One end of the bandage should be turned over for a distance of about 6 inches, this lap should be folded on itself and this process should be repeated till a small hard roll is formed. Then place the bandage on the thigh (the foot should be on a stool or chair so that the thigh is nearly at right angles to the body) with roll of bandage near the body, length of bandage at bottom of roll and bandage extending down the thigh. Roll, beginning with the fingers of right hand

running down to the wrist, and repeat till bandage is completely rolled. The left hand is used to hold the bandage tight and even. The bandage when completed should be in a hard roll with even edges. It may be fastened with a couple of pins.

Roller bandages are preferably used in the following sizes:

For the finger, $\frac{3}{4}$ of an inch wide and 1 yard long.

For the arm and head, $2\frac{1}{2}$ inches wide and 4 to 6 yards long.

For the leg and thigh, 3 inches wide and 6 to 8 yards long.

For the chest and abdomen, 4 to 5 inches wide and 8 to 12 yards long.

The bandage $2\frac{1}{2}$ inches wide and 4 to 6 yards long is the most generally used.

While it is not, of course, absolutely necessary to use the bandage best adapted in size for the part to which it is to be applied, it is very difficult to bandage satisfactorily a small part with a wide bandage. Any bandage when rolled may be easily cut through with a sharp knife and thus a bandage of the required size may always be obtained.

The roller bandage is applied by holding the roll in the right hand, the loose end being in the left, and laying the outer side of the end on the place where it is desired to start the bandage.

The simplest method of application is the Circular, but this can be used only when the part to be bandaged is of nearly the same circumference throughout. This is the case with the forearm above the wrist, and with the fingers. In first-aid work, however, the roller bandage is usually applied to hold splints or dressings in place which much extends the field of the circular method of application as, especially with splints, an even circumference is likely to be presented. The circular method is also more often available with gauze bandages, for on account of their elasticity they adapt themselves to slight pulling much better than do bandages made of stiffer cloth. The circular method of application consists simply of a series of circular turns from below upward, each turn overlapping the upper third of the one below.

Where the part is larger at one end than the other, at the start a few turns should be made round and round one over the other,

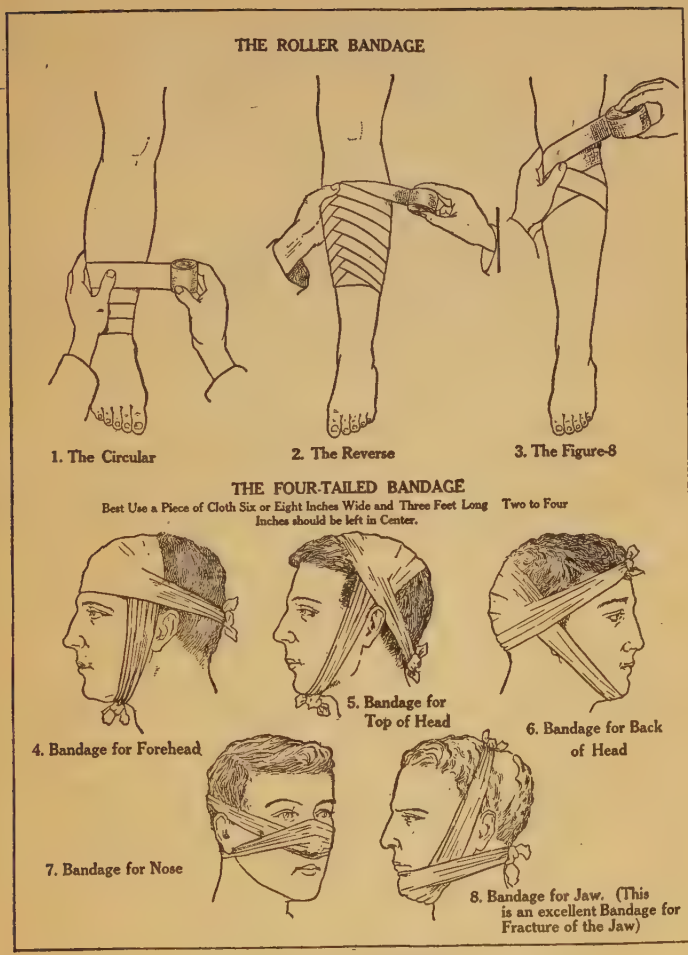

THE ROLLER BANDAGE
1. The Circular
2. The Reverse
3. The Figure-8
THE FOUR-TAILED BANDAGE
Best Use a Piece of Cloth Six or Eight Inches Wide and Three Feet Long Two to Four Inches should be left in Center.
4. Bandage for Forehead
5. Bandage for Top of Head
6. Bandage for Back of Head
7. Bandage for Nose
8. Bandage for Jaw. (This is an excellent Bandage for Fracture of the Jaw)

PLATE I.—Bandages.

then begin to move up the limb, using the circular method as long as a turn overlaps the preceding one about one-third. It will be found as soon as the limb increases much in size that if the bandage lies flat, uncovered spaces will be left. To prevent these spaces the Reverse must be employed. The Reverse is generally considered to be the most difficult point to learn in the application of any bandage.

To make the Reverse, place the thumb of the left hand on the lower edge of the bandage to hold it in place, slacken the bandage between the hands (about 3 inches) and turn the roller one-half over toward you. Pass the roller under the limb keeping the lower edge of the bandage parallel with that of the turn below, reverse again at the proper point and so on. The reverses should be made so they lie in the center of the limb or to its outer side and all reverses should be in one line up the limb.

The figure-of-8 bandage is found specially useful about joints. It consists of a series of loops each overlapping the one below by about two-thirds the width of the bandage. The middle part is over the bend of the joint while the loops lie one below the other above it.

The spica bandage is a modification of the figure-of-8 bandage, having one loop much larger than the other.

A very valuable exercise in the application of the roller bandage is afforded in bandaging the leg from the foot to include the hip. This gives an opportunity to practise all the methods of application which have been described.

For those unskilled in bandaging, lengths may be cut from a roller bandage and these may be tied or pinned in place in the same way that the folded triangular bandage is used. Some special bandages made in this way from the roller are described in the proper place.

3. **Four-tailed Bandage.**—This is especially useful for fractures of the lower jaw and injuries of the head. Preferably a piece of cloth 5 to 8 inches wide and from 2 to 3 feet long should be used. It should be doubled on itself and torn from each end until a piece about 4 inches long is left undivided in the middle.

The 4-inch roller can be used to make this bandage for the lower jaw; it is rather too narrow for the head. The four-tailed bandage is made from it exactly as described above.

How to Fasten Bandages

Triangular and four-tailed bandages are usually completed by tying the ends together securely though they may be pinned, and frequently with triangular bandages flaps are held in place by pinning. The free end of the roller bandage is usually turned over and pinned in place. Other pins are frequently used to hold the different layers of the roller bandage from slipping. A convenient method sometimes employed in securing a roller bandage is to rip the bandage down the center, then to tie a knot to prevent further ripping and carrying the ends around the limb in opposite directions, tie.

Knots should be placed where they do not cause discomfort and where they may be easily reached. If you know the reef knot use it, if not, three knots are quite as secure. Safety pins are better than ordinary pins as they hold better and scratching is prevented.

Precautions

Whatever the bandage used, care must be taken that it is not put on too tightly. It must not be so tight that it constricts at any point, for this will cut off the blood supply, and if the bandage is left in place for some time even so severe an injury as mortification or actual death of the part below may be caused. Pain, swelling and blueness or coldness of limb below the bandage show that the bandage is too tight and should be loosened or removed.

Always bandage firmly, but never too tightly or loosely.

Always in bandaging a limb, leave the tips of the fingers or of the toes uncovered so that they may be seen.

Always place the part to be bandaged in the position in which it is intended to leave it, as otherwise change of position may result in cutting off the circulation by drawing the bandage too tight at some point.

Never put on a bandage under, but always over a splint.

Always in applying a bandage immediately after an injury, remember that there may be swelling and use care in order that the bandage may not become too tight from this cause; always be ready to remove or to loosen a bandage when such swelling makes it too tight.

Never apply a bandage wet, for as it dries it will shrink and become too tight.

Always bandage from below upward with the roller bandage.

Never reverse the roller bandage over a sharp bone and always use the figure-of-eight over a joint.

Uses of Bandages

Bandages are used:

1. To keep dressings in place.
2. To hold splints in place.
3. To stop bleeding by pressure.
4. As slings.

Application of Bandages

Head Bandages.—Fold a hem about 1½ inches wide at the long side of the unfolded triangular bandage. Place the bandage so that the hem lies squarely across the forehead just above the eyes and the bandage is over the head with the point hanging down the back. Carry the two ends around the head above the ears, cross at the back and tie them across the forehead. Draw the point down tight, turn it up and pin it at the top of the head with a safety pin. (Plate II.)

This is a useful bandage.

The four-tailed bandage is also useful as a head bandage. It is applied in three ways. For the front of the head the center of the bandage is placed on the forehead and the ends crossed are tied at the back of the head and under the chin; for the top of the head the center of the bandage is placed there and the ends crossed are tied low at the back and under the chin; for the back, center is put at back of the head and the ends crossed, are tied at forehead and under chin. (Plate I.)

TRIANGULAR BANDAGE

This Bandage may be folded into a scarf and used on any part of the body.

1. Eye Bandage

2. Neck Bandage

3. Jaw Bandage

4. Head Bandage (Front)

5. Head Bandage (Rear)

6. Bandage for Palm of Hand

7. Arm Sling

8. Arm Sling from Shirt Sleeve

PLATE II.—Bandages.

Eye Bandage.—Place the center of the cravat made from the triangular bandage over the injured eye, bring the ends to the back of the head and tie. (Plate II.) A length cut from the roller bandage may be used in the same way.

Nose Bandage.—Four-tailed. Place center on nose, cross ends, carry one pair below and other above ear and tie both at back of head.

Jaw Bandage.—For this, two cravats are necessary if made from triangular bandage. Apply the center of the first across the chin in front, bring the ends to the back of the neck and tie. Place the center of the second cravat under the chin, cross the ends over the top of the head, bring them down and tie under the chin.

An excellent bandage for the jaw may also be made from the four-tailed bandage. The center is placed with its middle at the point of the chin and the ends are crossed, one pair being tied at the top of the head and the other at the back of the neck.

A single wide cravat may be placed under the chin, with the ends carried to the top of the head and tied there or a length from a roller may be used in the same way.

Neck Bandage.—The center of the cravat of the triangular bandage or of a length from a roller bandage is placed over the injured place and the ends are carried around the neck and tied as convenient. This bandage may sometimes be improved by the use of a cardboard support which is held firmly in place between the layers of the bandage.

Chest and Shoulder Bandage.—The triangular unfolded is used. The long side is placed horizontally across the chest, the upper end is brought over the shoulder, and the ends are tied at the back.

Chest and Pelvis Bandage.—A wide roller is applied around and around the body. Triangles in the form of cravats may also be used. (Plate VIII.)

Hand Bandage.—The triangular bandage is spread out. The hand is placed on it, palm down, with the fingers toward the point (if desired, the hand may be closed), and the wrist is at the long side. The point is then brought over the back of the

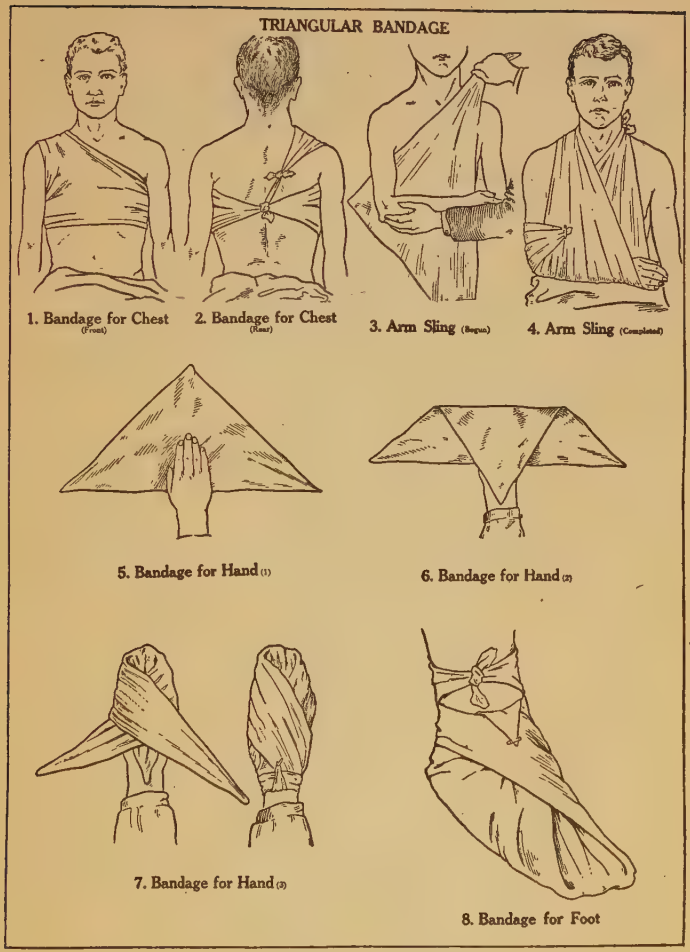

TRIANGULAR BANDAGE
1. Bandage for Chest (Front)
2. Bandage for Chest (Rear)
3. Arm Sling (Begun)
4. Arm Sling (Completed)
5. Bandage for Hand (1)
6. Bandage for Hand (2)
7. Bandage for Hand (3)
8. Bandage for Foot

PLATE III.—Bandages.

hand to the back of the wrist and the two ends are crossed over the wrist and tied.

Bandage for Palm of Hand.—Place the center of the cravat on the palm of the hand, cross the ends at the back of the hand and again at the front of the wrist and tie at the back of the wrist. (Plate II.)

Crotch Bandage.—This is the T bandage. It is made from two lengths of a 3-inch roller bandage. To the center of one of these, 1½ yards long, is sewed or pinned at right angles the other, which is 1 yard long. The bandage is applied by placing the long strip around the waist with the short one at the middle of the back. The long strip is then pinned in front and the short strip is brought forward between the legs to join the long one at the center in front where it is pinned.

Foot Bandage.—Spread out triangular bandage. Place foot in center with toes toward point. Raise point over toes to instep in front. Bring both ends forward, cross them over instep and tie them round the ankle.

Bandages for Splints and Dressings.—When roller bandages are used to hold splints or dressings in place they are wound around and around in the manner already described. For the same purpose cravats are made of triangular bandages. These are simply carried around the splint or dressing and the limb, body or head and are tied in place. The number of cravats is dependent on the length of the splint or dressing.

Slings.—1. Arm slings:

Place one end of a triangular bandage over shoulder of uninjured side. Allow length of bandage to hang down in front of chest so that point of triangle will be behind elbow of injured arm. Bend elbow of injured arm to a right angle. This will bring forearm across middle of bandage. Then carry lower end of the bandage over the shoulder of the injured side and tie to the upper end behind the neck. Bring the point of the bandage at the elbow forward to the front and pin there so that bandage is snug but does not pull.

This makes an excellent arm sling, but even without a bandage a good sling may be made for the arm by pinning the sleeve or

the skirt of the coat to the front of the coat. The shirt may be used in the same way.

The cravat may also be used for an arm sling. For this purpose it is employed in the form of a loop which encircles the forearm bent at a right angle and the neck.

Still another arm sling is made from the roller bandage. For this a 3- or 4-inch roller is required, preferably the latter. Bend the forearm on the arm at the angle at which it is desired to hold it; this is usually about a right angle. Put the end of the roller about midway between the forearm and shoulder and hold for a moment to get length required when it may be allowed to drop. But before doing so pass roller in front and under forearm just in front of the elbow. Then carry roller along front of chest to the shoulder on the injured side, over this shoulder to back of neck, in front of sound shoulder, down to make loop for hand, back over sound shoulder, back of neck and in front of shoulder of injured side to starting point where length required will be cut off and the ends will be tied together. Two loops have, of course, been made, one for the forearm near the elbow and the other for the hand.

QUESTIONS

1. What are the different kinds of bandages?
2. What are the advantages of the triangular bandage for first-aid purposes?
3. What is the size of the triangular bandage?
4. What is the best material for the roller bandage?
5. Sizes of the roller bandage for different parts of the body.
6. What are the spica and the figure-of-eight bandages used for?
7. How would you make a four-tailed bandage?
8. What precautions must be taken in putting on bandages?
9. For what purposes are bandages used?

PRACTICAL EXERCISES

Show the different bandages and how the triangular bandage is used, unfolded, folded and as a cravat.

Put bandages on the different parts of the body and show how they are used to keep splints and dressings in place and as slings.

As much practice in bandaging by the class as time permits.

CHAPTER III

INJURIES IN WHICH THE SKIN IS NOT PIERCED OR BROKEN

Bruises, Strains, Sprains, Dislocations and Fractures

These are the commonest injuries and no one can hope not to suffer from some of them. Of course many bruises and strains are unimportant.

Causes.—These injuries are all caused by violence in the form of blows or falls, or by wrenching the body.

This does not apply to all compound fractures,* however, as will be seen later.

Prevention.—These injuries occur under so many different circumstances that it is impossible to suggest other than the most general means for preventing them. It is safe to say, however, that a great many of them result from carelessness and that especially in dangerous places, people should be more alive to their surroundings. In other words, they should always exercise common care.

Posted directions should always be observed. Such directions are not arbitrary, as they are, unfortunately, sometimes regarded, but represent the teachings of experience.

Structure and Mechanics of the Body.—Before studying these injuries it will be necessary to know something of how the body is made. The body has both hard and soft parts. The bones are the hard parts and the muscles and the internal organs, such as the heart, lungs, liver, etc., constitute the soft parts.

* Compound fractures are more conveniently described under fractures, though properly they are wounds and first and foremost require the treatment of such injuries.

BONES

The bones are hard and firm and together make up the Skeleton.

The skeleton—

Forms a strong and rigid frame-work for the body.

Supports and carries the soft parts.

Protects vital organs from injury.

Gives attachment to muscles.

Forms joints so that movements are possible.

The skeleton is divided into three parts:

1. **The Head,** made up of the Cranium, a bony case which encloses and protects the brain; and the Face, with the eyes, ears, nose and mouth. The only movable bone in the head is the lower jaw.

2. **The Trunk,** which is divided into two parts by a muscular partition—the diaphram. The upper portion is the Chest, which contains the esophagus or gullet, the lungs, the heart and some large blood-vessels. The lower portion is the Abdomen, in which are found the stomach, liver, kidneys, bladder, the intestines and other organs.

The trunk is formed of several bones which are of interest to the first-aid student.

The Spinal Column, a strong pillar with several curves, is made up of a number of bones called vertebræ with a softer substance called cartilage between them. At its lower end, the spinal column terminates in the broad Sacrum or Rump Bone and the pointed Coccyx. The spinal column supports the head and the ribs, and is itself supported on the pelvis.

The Ribs, 12 in number, form the greater part of the walls of the chest. All the ribs are connected to the spinal column behind, but the two lower ones on each side are shorter than the others and are not connected to anything in front. The 10 upper ones on each side are united to the Breast-bone.

The Breast-bone or Sternum is a flat, dagger-shaped bone which forms the front on the chest. Above it forms joints with the Collar-bones, or Clavicles, being notched for the purpose on each side.

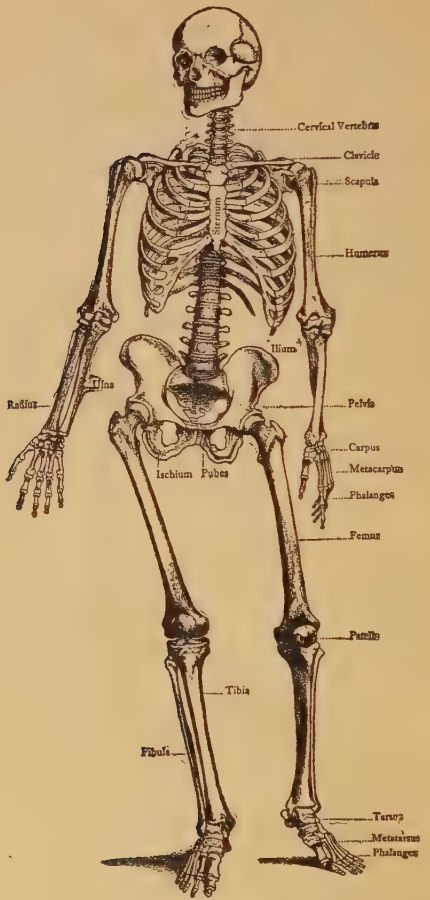


PLATE IV.—The skeleton. (*Holden.*)

The Pelvis is a wide, strong, bony basin formed of the Haunch bones at the front and sides and partly behind where it is closed by the sacrum and coccyx. It supports the trunk and forms joints with the lower limbs.

3. **The Upper and the Lower Limbs.**—Each upper limb is made up of the Scapula or Shoulder-blade, a flat, triangular bone at the back of the shoulder; the Clavicle or Collar-bone, a curved long bone placed horizontally across the upper part of the chest above the first rib; the Humerus, the bone of the upper arm; the Radius and the Ulna, the two bones of the forearm; and the Hand, which has 8 small, irregular bones in the Carpus or wrist, five Metacarpal Bones for the hand itself, and 14 bones, Phalanges, in the fingers and thumb.

Each lower limb is made up of the Femur or Thigh-bone; the Patella or Knee-cap; the Tibia and Fibula, the two leg bones; and the Foot. The foot is made up of the Tarsus, with seven irregular bones, which form the heel, part of the ankle, and the instep, 5 Metatarsal Bones for the middle of the foot; and the toes with 14 bones, Phalanges.

The principal interest which bones have for the student of first aid is that they may be broken or fractured, one of the commonest accidents.

JOINTS

Wherever two or more bones are in contact or touch each other they form a joint. The ends of bones forming a joint are covered with a smooth substance called cartilage or gristle, so that they may move without friction on each other. Joints are hermetically closed by a flexible sac, the capsule, which secretes an oily fluid. This fluid lubricates a joint just as oil does an engine. The ligaments of a joint are strong, fibrous bands which hold the bones together. The most important joints to study are the hip and shoulder, which are ball-and-socket joints having movements in all directions, and the elbow, wrist, knee and ankle, hinge joints. These have only to and fro movement like an ordinary hinge.

Joints are of importance to the student, as bones are liable to be put out of place or dislocated at the joints.

MUSCLES

The movements of bones at the joints are caused by the Muscles.

The muscles, the flesh or meat, form two-fifths of the body by weight. They are made up of red fibers which have the power of shortening or contracting, so that if one end of a muscle is fixed and the muscle is contracted the other end will pull on and move whatever it is attached to. By doing this muscles cause all the movements of the body. For example, the biceps, the big muscle at the front of the upper arm, in contracting causes the elbow-joint to bend by bringing the forearm closer to the upper arm. All muscles are somewhat on the stretch, as otherwise prompt movement would be impossible. Some of the muscles are attached to bones by Tendons or Sinews. These are strong, fibrous cords. They may be well seen in the wrist.

Muscles are of great interest both in fractures and in dislocations, as their pulling causes displacements and their resistance offers the chief obstacle to setting fractures and to reducing dislocations.

SUBCUTANEOUS TISSUE

This name is given to the fatty layer or padding which lies immediately beneath the skin. In this are found many small blood-vessels and nerve endings. The force of a blow or fall is often expended on this tissue.

The injuries which will now be spoken of affect the structures of the body which have just been described.

BRUISES

Description.—These are the commonest injuries. When a person falls and strikes some part of his body or when he is struck by something, usually the skin in not broken, but the

PLATE V.—The muscles. (*Brubaker.*)

force of the blow or fall injures the subcutaneous tissue, which lies immediately beneath the skin, breaking numbers of small blood-vessels therein. Blood escapes from these small vessels and this causes the swelling and the ordinary black-and-blue spot which is due to the blood which has escaped.

Causes.—Blows or falls.

Symptoms.—Pain at once from injury to nerves. Swelling from escape of blood from blood-vessels. Black-and-blue spot from same cause. Pain also later from pressure of this blood on sensitive nerves.

Pain is increased by movement.

Treatment.—Slight, no treatment. More severe, object is to limit swelling and to decrease pain. At once: Ice or very hot or very cold water, or half alcohol and half water. Arnica or witch-hazel. These contract the injured blood-vessels and so prevent escape of more blood and also deaden the nerves to some extent, thus relieving pain. Ice may be applied directly to injured part. Best in using liquid remedy to wet cloth with liquid and then to apply cloth. Raising bruised part diminishes pain, as it diminished the blood-supply. In arm, when severe and movement is painful, use a sling. No doctor is usually required for a bruise.

Warning.—A bruise may be only the least important part of an injury. So with a bruise always try to make sure there is no other injury, such as a broken bone.

Bruises of the chest and abdomen sometimes result in internal injuries. These may be very dangerous from breaking of the blood-vessels of the lungs, of the abdominal organs, or from actual rupture of the soft internal structures. Severe bruises of this character therefore demand the immediate attention of a physician. In case shock is very severe after a bruise of the abdomen or chest, serious injury of the internal organs should be suspected.

STRAINS

Description.—A strain is the name given to the injury produced by overstretching of a muscle. In severe strains small blood-

vessels in the muscles are often broken so that blood escapes into the muscles in the same way that, with a bruise, blood escapes into the subcutaneous tissue. The commonest strains are of the muscles of the back and shoulders and of the small tendons of the wrist and ankle.

Cause.—Usually a sudden wrench—may be due to lifting too heavy a weight.

Symptoms.—Pain, increased on movement. Stiffness. Lameness. More or less swelling.

Treatment.—Not necessary to call doctor unless severe. Absolute rest at first. Alcohol and water, arnica or witch hazel gently rubbed in to deaden pain. In both upper and lower limbs, rubbing should always be toward the body. Later such rubbing may be harder to help absorption and to make strained muscles more supple. When pain and stiffness are less, gentle movement should be practised until both have entirely disappeared.

SPRAINS

Description.—Sprains are injuries of joints. They result from violent stretching, twisting and partial breaking of the ligaments about a joint and are sometimes accompanied by actual breaking of the bones. The twisting or stretching results in breaking of the blood-vessels and the escape of blood and of blood-serum (the liquid part of the blood) both around and into the joint. Sprains of the wrist and ankle are most common.

Cause.—Unnatural movement of a joint. Sometimes the cause is a slight one, such as twisting the foot in stepping down from a street curb.

Symptoms.—Severe pain immediately. Pain is much increased by movement of the joint. Swelling of joint. Bones are not out of place and appearance of joint is unchanged except for the swelling. Shock when severe.

Treatment.—Call doctor always when severe or when in doubt. Always begin treatment at once whether doctor has been called or not. Absolute rest in order not to do more damage by

rubbing of the injured joint surfaces together. This means that the patient should not be allowed to move the joint or to step on it. Elevate joint when possible and apply heat or cold. Less blood will come to the injured joint if it is elevated and heat or cold contracts the blood-vessels and thus limits the escape of blood and serum. Cold may be applied in the form of snow or crushed ice in a cloth. It is usually better to use cloths wrung out in very hot or very cold water or to shower the joint with very hot or cold water. Putting sprained joint under a cold or hot water tap is also excellent.

Either heat or cold should be made use of sufficiently long to get full benefit from it, that is to say, from 24 to 48 hours. At first on the application of either heat or cold, the pain may increase, but after an hour, at the latest, it will commence to improve and will finally disappear. Remember there may be shock and, if so, treat.

Warning.—A severe sprain, especially a sprain of the ankle, is by no means a trivial injury but one which demands the services of a physician.

DISLOCATIONS

Description.—Dislocations are injuries of joints and are due to the head of a bone slipping out of its socket. A dislocation cannot occur, except in a joint which has been dislocated before, without tearing the ligaments which keep the bones of the joint close together. Some persons, however, on account of frequent dislocations of the same joint have its ligaments so stretched that not only is dislocation easy, but no further injury of the ligaments results from it. By far the most frequent dislocation is that of the shoulder-joint, which occurs in one-half of all cases of dislocation. But dislocations of the hip-joint, the jaw and the fingers are not particularly uncommon.

Causes.—Dislocations are usually caused by a blow or a fall, but sometimes result from a violent muscular effort, such as throwing a stone.

Symptoms.—Deformity; that is, the joint has an unusual

appearance, because the head of the bone is not in its proper place. This may be best seen by comparing the injured with the uninjured side of the body.

The limb in which a joint is dislocated may be either longer or shorter than the uninjured limb. This depends on the direction in which the dislocation has taken place. The head of a dislocated bone may often be felt out of its place. Limited movement as the displaced head of the bone is tightly held in its new position. Pain from pressure by the displaced head of the bone on sensitive nerves. Swelling from bruising of the soft parts by the displaced head of the bone but is often not noticeable. Shock.

Treatment.—Send for a doctor at once. Treat shock if necessary. Always await the doctor's arrival except in dislocation of the jaw, the fingers, and the shoulder, without attempting to put the head of the bone back in its proper place. This is called reducing a dislocation.

Remember that attempts to reduce dislocations, other than those of the finger and jaw, by one without a doctor's training may result in great harm to the patient, for the movements necessary to do so may cause serious injury to the blood-vessels, nerves and soft parts.

When no attempt is made to reduce the dislocation, the patient should be put in a comfortable position and the injured joint should be covered with cloths wrung out in very hot or very cold water so as to contract the vessels and to prevent swelling as much as possible.

Dislocation of the Lower Jaw

This may usually be successfully treated by almost anyone. This is fortunate, as a dislocated jaw with the open mouth in consequence is most painful and uncomfortable. To reduce a dislocation of the jaw, both thumbs must first be wrapped in several layers of cloth so that they will not be liable to injury. Both thumbs are then placed in the patient's mouth resting on his lower teeth on each side while the fingers seize the lower

jaw outside. First pressure is made downward and then backward. As soon as the jaw starts into place the thumbs should be slid off the teeth to the inside of the cheeks or they will be caught between the teeth when the jaw springs into place. The overstretched muscles act just like rubber bands and one must be quick or his thumbs will be injured. When dislocation is reduced put on jaw bandage.

Dislocation of the Fingers

These, not including those of the second joint of the thumb, present no great difficulties to the first aider. The dislocated finger should first be grasped firmly on the hand side. The end of the finger should then be pulled straight out away from the hand and the bone will usually slip into place. No bandage will be required.

Dislocation of the Shoulder

No attempt should be made to reduce this dislocation if the services of a physician can be obtained within a reasonable time, say four hours. Make your decision on this point at once, for if you are compelled to attempt to reduce the dislocation you must get to work immediately before the muscles have become set and rigid from the irritation caused by the displaced head of the bone.

Frequently little difficulty will be experienced in reducing a dislocation of the shoulder, especially if the joint has been dislocated before. To accomplish it, the patient should be made to lie down flat on his back. The person who is going to try to reduce the dislocation should then sit down beside him on the injured side facing toward his head and should place the heel of his foot nearest the injured person, after the shoe has been removed, in the arm-pit of the patient's injured side and then draw down the dislocated arm and drag it toward the uninjured side at the same time pressing outward and upward with the heel. This will usually force the upper end of the dislocated bone out-

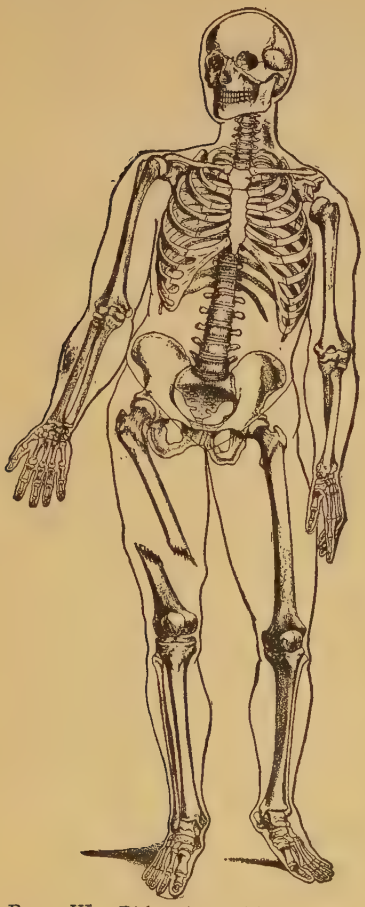


PLATE VI.—Dislocation and fracture.

ward, and as soon as it is free it will snap back into place. In order to keep the bone in place, the arm should then be bandaged to the side with the forearm carried across the chest and the hand placed on the opposite shoulder.

Warning.—In case difficulty is experienced in reducing any dislocation, stop at once.

FRACTURES

Description.—When a bone is broken, the injury is called a fracture. Our bones are brittle and when the force used against them is sufficient they break much as would a dry stick. Fractures are among the commonest severe injuries, ten times as common as dislocations. About two-thirds of all fractures are of the bones of the limbs. Next in frequency are those of the collar-bone and ribs. Fractures of the skull, spine and pelvis are comparatively rare.

A simple fracture is one in which the skin is not pierced.

A compound fracture is one in which the skin is pierced.

Causes.—Simple: blows and falls. Compound: also—from bad handling of simple fractures and from wounds.

Prevention.—Simple: as given under general heading. Compound: also—by proper handling of simple fractures and the prevention of wounds.

Symptoms. Simple fracture.—The injured person has had a blow or fall. Pain at point of fracture. Tenderness at point of fracture. Person injured is unable to move broken limb. Deformity; a fractured limb will be altered in shape and shortened or bent. Always compare with the uninjured side.

Recognition by touch—an inequality may often be felt by running finger along a broken bone.

Loss of rigidity of bone. On moving a limb in which a bone is fractured, instead of the bone being moved as a whole it will be noticed that at the point of fracture there is unusual movement something like that of a hinge.

Crepitus. This is the surgical term applied to the grating which is heard or felt when the broken ends of the bone rub on each other.

Shock.

Warning.—As one may do great harm by moving a broken bone, for the broken ends are likely to be very sharp, it is much safer when an injured person is unable to move a limb, and from appearances it seems probable that a fracture has occurred, to conclude that it is a fracture without further examination, and to so treat it.

Treatment. Simple Fracture.—Send for a doctor. Treat shock.

The object of the further treatment before the doctor's arrival is to prevent more injury, especially puncture of the skin by the sharp, knife-like edges of the broken bone. If this occurs the simple fracture is, of course, converted into a compound fracture. In the former injury there is no chance of wound infection as the unbroken skin prevents germs from reaching the break in the bone, while in the latter the skin is cut through and in consequence germs reach the broken bone ends and infection occurs. So instead of the few weeks of comparatively painless healing of the simple fracture without much danger, a compound fracture is caused with probable wound infection, inflammation, pus or matter, and perhaps months of sickness from blood-poisoning, with considerable danger of death. In the treatment of simple fractures your principal object is accomplished by preventing movement of the ends of the broken bone.

If the doctor may be expected to arrive promptly, nothing need be done except to put the patient in a comfortable position. If it is evident that in order to do this the broken bone will be moved, it must be supported firmly by your hands. One hand should support the broken bone on each side of the break. The bone must not bend.

Afterward the broken bone had best be supported in the natural position on a pillow or a folded coat. In so supporting it great care must be taken that it is not bent or does not drag on the point of fracture.

If the patient must be moved more that slightly, as just described, the broken bone must be set; that is to say, it must be gently drawn into its natural position, always determining

this by comparing it with the opposite side, and held there firmly by splints.

If the injured person is wearing thin summer clothing, it will not usually be necessary to remove the clothing in order to examine for fracture. In fact, it will be better not to try to do so, as this may result in injury from moving the sharp ends of the bone, and when the clothing is left on it furnishes excellent padding for splints. With thick clothing, however, very likely one will not be able to tell that a fracture has occurred or what the character of the injury is. In this case never try to take off the clothing, but cut it in the seams with a sharp knife or scissors.

Symptoms. Compound Fracture.—Besides the symptoms already described, there is a wound leading down to the broken bone, or the broken end of the bone sticks through the skin.

Treatment. Compound Fracture.—1. Send for doctor.

2. Treat shock.

3. Expose fracture by cutting clothing.

4. Turn back clothing from wound.

5. Always treat wound first, then fracture.

6. Do not touch wound with fingers or anything else.

7. As soon as possible procure an antiseptic or surgically clean compress and place it on the wound.

8. Then use same precautions as in simple fracture to prevent movement of sharp ends of broken bone. (Splints and padding.)

9. If a sharp bone is button-holed through the skin, as frequently happens, do not attempt to restore it to its place, but after dressing wound, hold it in position as it is with splints.

Warning.—Never in any fracture attempt to transport the injured person until the broken bone is firmly held in position by splints.

More about Splints.—Splints are used for fractures and suspected fractures. Their purpose is to prevent movement at the point where a bone is broken. They must, therefore, be made of a stiff material. For first-aid purposes splints must generally be improvised from something which may easily be procured on the spot. Such articles are pieces of wood, broom handles,

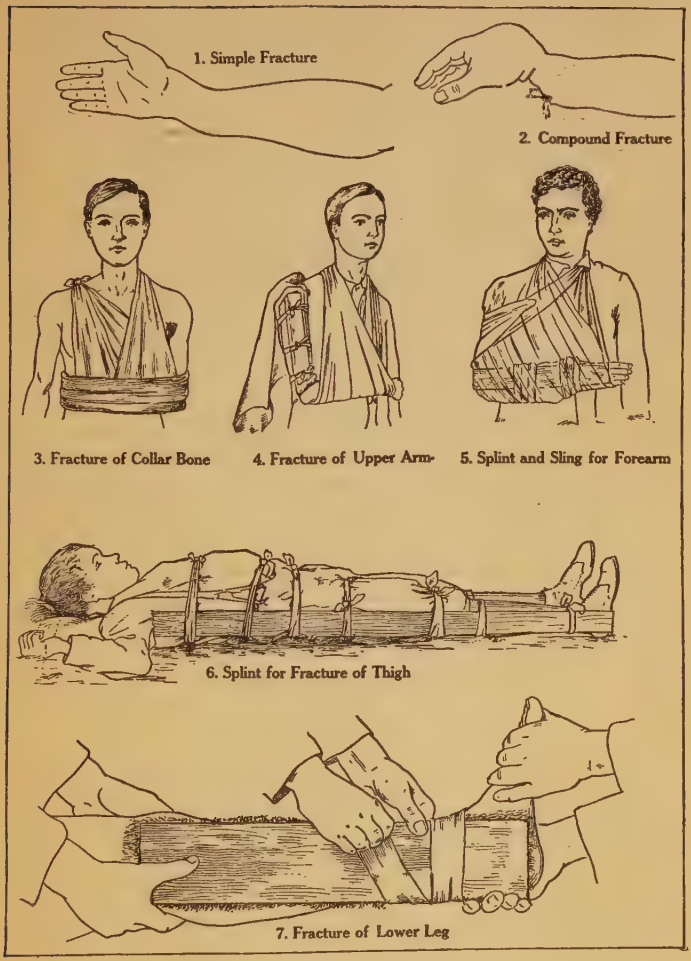

1. Simple Fracture
2. Compound Fracture
3. Fracture of Collar Bone
4. Fracture of Upper Arm
5. Splint and Sling for Forearm
6. Splint for Fracture of Thigh
7. Fracture of Lower Leg

PLATE VII.—Fractures.

lathes, rules, squares, wire netting, heavy cardboard, umbrellas, canes, pick handles, spades, rolls made of blankets or cloth, pillows alone or with pieces of board outside, rifles, swords and bayonets. With a broken leg it is possible to use the other leg as a splint.

In improvising splints a few precautions should be observed. Besides being rigid enough to prevent movement at the point where a bone is broken, they should be long enough to prevent movement at the nearest joints, as this will move the broken bone, and they should preferably be as wide as the limb to which they are applied, as otherwise the bandages holding them on will press on the limb as well as on the splint and thus cause pain and perhaps displace the ends of the broken bone. On account of the danger from swelling and in order to promote the comfort of the patient and not to rub the skin, splints should be well padded on the inner side with some soft material. The clothing sometimes answers this purpose fairly well when it is not removed. Substances generally used are cotton batting, waste, tow, flannel, pieces of cloth, grass, etc. If splints are not well padded, the limb to which they are applied must be watched with special care because the swelling is likely to make the splints too tight which will cut off the circulation and may cause mortification.

Special Fractures

Fracture of Upper Arm and Forearm

Symptoms.—These fractures may almost always be easily detected by the symptoms already given.

Treatment.—Send for doctor. Treat shock. Gently straighten limb so as to put it in natural position. Secure two splints long enough, in upper arm to extend from shoulder and arm-pit to elbow, and in forearm from elbow to middle of hand. These are best flat boards; shingles are excellent, but may be of any stiff material, such as twigs, covers of wine bottles, tin troughs, etc. Pad splints well. In upper arm, apply one splint to inner and the other to outer side of arm. Support by

sling. In forearm: Place forearm across the chest, thumb up. Apply one padded splint—clothing will do for padding—to outer side from elbow to beyond wrist and the other to inner surface extending to tips of fingers. Support by sling.

Broken Wrist

This is an extremely common injury resulting from a fall on the hands which are put out in falling forward to prevent the body from striking the ground.

Symptoms.—This belongs to a class of fractures to which the name impacted is given. The force of the injury actually drives one bone into the other so that they are held together. Great deformity, no crepitus, movement, etc.

Treatment.—Send for doctor. Treat shock. Do not attempt to free bones, but leave them as they are. Otherwise treat like fracture of forearm.

Broken Fingers

Symptoms.—Usual symptoms of fracture, which is easily detected.

Treatment.—Gently draw into natural position. Put narrow padded splint under finger and hold it in place with a narrow bandage. Support hand in sling. Show to doctor as early as practicable.

Crushed Hand or Foot

Symptoms.—Are due to a heavy weight falling on or passing over the hand or foot. Many or few of the bones of the wrist and hand or the foot and ankle may be crushed. Usual symptoms of fracture. Much pain. Great swelling.

Treatment.—Hand: Apply a padded splint to the front of the hand. This should be as wide as the hand and long enough to go from the middle of the forearm to beyond the tips of the fingers.

Foot: Remove shoe. Padded splints, bottom of foot from

heel to toes. A figure-of-8 bandage will be found most convenient to hold this in place. Raising foot will relieve pain.

Fracture of Lower Leg

Symptoms.—As given above. Patient falls to ground. Is not usually difficult to detect fracture.

Treatment.—Send for doctor. Treat shock. Secure pillow, sack stuffed like pillow with hay, straw or the like or a blanket rolled so as to make trough. Gently lift the leg to pillow, or on to the trough of the blanket, placing one hand above and the other below break, under leg, always holding in natural position. Then should not allow toes to turn in or out, but should be supported in same position as toes of uninjured leg. Nothing further unless must move patient. If this must be done the leg should be drawn into natural position and splinted. Use two splints when procurable. Though any stiff material may be used for these splints, preferably they should be of thin boards longer than the leg so as to prevent movement at the knee-joint, and wider than the leg is thick. The splints may be applied outside of pillow, one at the inner and the other at outer side of leg. They should be held in place by 3 or 4 strips of cloth, straps or handkerchiefs passed around splints, pillow and leg and tied. Care must be taken that none of these strips is directly over break, as this will cause intense pain by pressure. The pillow alone makes a fairly good support even without splints. Splints also may be used without a pillow. If this is done the clothing, straw, hay, cotton, leaves or something else soft must be used for padding under the splints, which are tied in place in the way described above. In case of emergency anything stiff of sufficient length, such as a cane, umbrella or the like, may be used for the outer splint, the other leg being used for the inner splint. The strips of cloth or handkerchiefs are then passed around the splint and both legs and tied as before.

Fractures of Thigh

Symptoms.—As above, patient falls to ground. May be difficult to detect fracture on account of thick muscles.

Treatment.—The necessity of procuring a physician and of treating shock are greater than in fracture of the leg. Remarks in reference to careful handling of broken bone in fracture of the lower leg, apply. If difficult to detect fracture, treat as fracture.

A long splint extending in a solid piece from foot to arm-pit is required for outside splint to prevent movement of hip-joint. This should be firmly fixed by encircling strips of cloth to the chest as well as to the limb. Seven strips will be required. Inner splint had best extend from crotch to foot. If no inner splint can be obtained, tie legs and thighs together.

Broken Knee-cap

Symptoms.—As above, patient falls to ground and cannot raise leg. Not difficult to detect fracture, as can feel groove in knee-cap immediately beneath the skin.

Treatment.—Services of a physician will be required and shock generally demands treatment. Must also use care in moving leg.

Straighten leg. Secure splint long enough to extend from middle of thigh to middle of lower leg. Preferably, this should be a thin board as wide as thigh, but a cane, umbrella or the like may be used in case of emergency. Make pad for splint, apply splint to back of thigh and leg with middle opposite bend of knee and tie in place with strips of cloth or handkerchiefs. Be careful not to put bandage over break, but one strip immediately above andone immediately below knee.

Fracture of Collar-bone

Symptoms.—Patient supports elbow of injured side with hand of other side. Is unable to raise arm above shoulder. Is easy to feel depression by running finger over injured collar-bone.

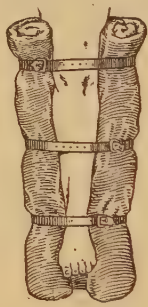
Treatment.—Send for doctor. Treat shock.

Make pad from a large handkerchief, two medium-sized handkerchiefs, a triangular bandage or the like. Place this pad in arm-pit of injured side. Put arm in sling with forearm at right angle to upper arm.

1. First Aid Dressing Applied Around Body for Broken Rib.

2. First Aid Bandage Around Hips for Broken Pelvis.

3. Blanket Splint for Leg



4. Improvised Splint for Leg

5. Improvised Splint for Arm.

James F. Brenner

PLATE VIII.—Fractures.

Take a bandage about 3 inches wide, put this horizontally around body and injured arm at elbow. It will, of course, encircle both the elbow, the bent arm and the body. When tied, by pulling elbow to body it will force upper end of humerus outward, and thus prevent broken ends of collar-bone from overlapping.

Another method:

Have patient lie down and place his injured shoulder on pillow in a comfortable position till doctor arrives.

Fracture of Ribs

Symptoms.—Sharp pain on taking a long breath or coughing. Breathing is usually short, patient often presses hand to side to prevent movement of chest.

May feel grating of ends of broken bones on each other by placing hand on chest at point where pain is most severe.

Treatment.—Tie a large handkerchief or a triangular bandage firmly around the chest, pin a large towel snugly around chest or best apply a roller bandage to chest. These limit chest motion and thus diminish pain.

If shock is severe, call doctor immediately. If not, after bandage is in place may visit a doctor as soon as practicable. Treat shock.

Fracture of Skull

Symptoms.—Patient is probably unconscious from injury to brain. If at base of skull, there will probably be a discharge of blood from nose, ears or mouth. If at top of skull, fracture may easily be felt under skin.

Treatment.—Send for doctor. Place in lying-down position with head slightly raised and keep very quiet until doctor arrives. Treat shock but no stimulants unless patient is very weak.

Fracture of Lower Jaw

Symptoms.—Mouth open, patient cannot speak. Fracture may often be felt outside, and inside there will be an irregularity of the teeth. May be bleeding from gums. Shock.

Treatment.—Send for doctor. Treat shock.

Gently raise broken jaw and bring lower against upper teeth. Support in this position with the jaw bandage or with two strips of bandage, one vertical, tied over top of head and the other longer, brought to back of head, crossed and brought horizontally to forehead and tied there.

Broken Back

Symptoms.—Patient unable to move. No motion or feeling in body below injury.

Treatment.—Send for doctor at once. If possible, do not move patient before his arrival. Treat shock.

If patient must be taken from the spot where his injury has occurred, procure ample assistance to lift him. This should be done with the greatest care so as not to bend spine for this will crush spinal cord.

Put stretcher under patient and gently lower him to stretcher.

Fracture of Nose

Symptoms.—Usually not difficult to detect. Pain, swelling, crepitus and deformity. Swelling may be so great that obscures deformity. Is not infrequently compound.

Treatment.—Put in as natural position as possible and hold there with an adhesive-plaster strip across nose from cheek to cheek. Before applying plaster, put a small compress of gauze on each side of nose. If you have no adhesive plaster put on bandage over nose and around head, but do not pull tight enough to flatten nose. Consult doctor, as there is danger of permanent deformity.

QUESTIONS

1. What are the common injuries without a break in the skin?
2. How may such injuries be prevented?
3. Of what is the body composed?

4. What is the skeleton and what does it do as a part of the body?

5. Of what parts is the head made up?

6. Into what two parts is the trunk divided and what does each contain?

7. Describe the spinal column; the ribs; the breast-bone; and the pelvis.

8. Of what bones is the upper limb formed? The lower limb?

9. What is a joint?

10. What movements do joints have? Give an example of a ball-and-socket and of a hinge joint.

11. What are the muscles?

12. What is the purpose of the muscles?

13. What is the importance of muscles in reference to fractures and dislocations?

14. What is the subcutaneous tissue?

15. Describe bruises.

16. What are the symptoms of bruises?

17. How would you treat them?

18. In a severe bruise what else must you look out for?

19. What is a strain? How is it caused? What are the symptoms?

20. What is the treatment?

21. What is a sprain? How is it caused? Symptoms? Treatment?

22. Is a severe sprain a slight injury?

23. What is a dislocation?

24. How are dislocations caused? Symptoms? Treatment?

25. Under what circumstances would you be justified in trying to reduce a dislocation?

26. When should you proceed to do so?

27. Danger of attempts to reduce dislocation?

28. Describe special treatment for dislocations of the lower jaw, finger and shoulder.

29. What is fracture?

30. What is a simple fracture?

31. What is a compound fracture? Causes of simple fractures and of compound fractures?

32. How would you prevent a simple fracture from becoming a compound one?

33. How would you recognize a simple fracture?

34. How would you treat a simple fracture?

35. How would you recognize a compound fracture?

36. Treatment of compound fracture?
37. What is a splint?
38. From what materials may a splint be made?
39. Precautions in applying splints?
40. Symptoms and treatment of fracture of the upper arm and forearm; of wrist; of fingers; crushed hand—foot; of the lower leg; the thigh; of knee-cap; of collar-bone; of ribs; of skull; of lower jaw; of back; of nose.

PRACTICAL EXERCISES

Show methods of treatment of dislocations of lower jaw, shoulder and fingers.

Show methods of treatment of a simple fracture.

Show application of splints in fracture of upper arm and forearm; wrist; fingers; crushed hand and foot; fracture of lower leg; the thigh; the knee-cap; collar-bone; ribs; skull; lower jaw; back; nose.

Practise in bandaging and the application of splints.

CHAPTER IV

INJURIES IN WHICH THE SKIN IS PIERCED OR BROKEN: WOUNDS

Injuries in which the skin is pierced or broken are called wounds. As will be seen, such injuries have certain dangers that other injuries are free from. In order to understand them it is necessary for the first-aid student to know of the protection afforded the body by the skin and of the action of certain germs on the body.

The Skin

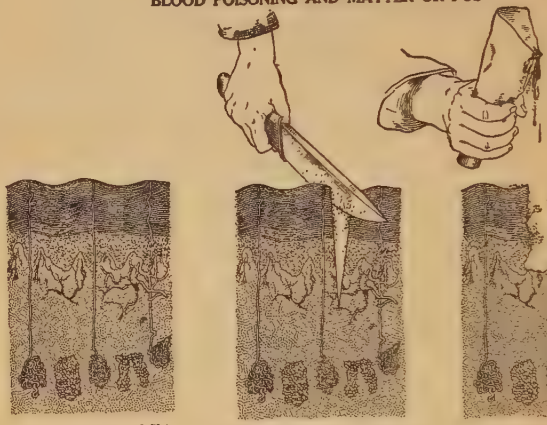
Of course, everybody knows what the skin is. It is the covering of the entire body. The skin is made up of different layers. The outside horny layer protects the body from the entrance of pus germs which are the very small parasites which cause inflammation, matter or pus and blood poisoning. Remember that these pus germs always come from outside the body and if the skin is unbroken they cannot enter it. In consequence any injury in which there is a break in the skin is liable to the additional, and perhaps very great danger due to pus germs.

The Germs

The action of pus germs on the body is very important. The wonderful operations which modern surgeons are able to perform are entirely due to their knowledge of how to protect the body from the injurious effects of these germs.

With an injury of the body from a mechanical or chemical cause the effect of the injury appears at once. With germs this is different, however. Everything looks all right at first and the

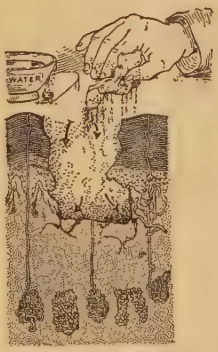
BLOOD POISONING AND MATTER OR PUS



1. Normal Section of Skin (magnified)

2. Showing Clean-cut Wound Caused by a Sharp Instrument

3. Wound Caused by a Blunt Instrument



4. Infection by Handling, or Water

5. How to Care For a Wound
A Clean Dressing

PLATE IX.

DESCRIPTION OF PLATE IX.

1. NORMAL SECTION OF SKIN.

(Magnified.)

Note the upper horny layer. This protects the body from the entrance of pus germs which are the very small parasites which cause inflammation, matter or pus or blood poisoning.

2. WOUND CAUSED BY A SHARP INSTRUMENT.

In a wound caused by a sharp instrument, while the protection of the skin is lost, comparatively few germs are carried into the wound. Most of these are washed out by the blood. The very slightly injured cells of the body are able to destroy many others. So such wounds are not as dangerous as ragged, torn wounds. No germs float in the air and there is no danger in exposing wounds to the air.

3. WOUND CAUSED BY A BLUNT INSTRUMENT.

With a blunt instrument many more germs are driven in. The bruising of the tissues of the body makes the cells much less able to destroy the germs and bleeding is not so free. So such wounds are much more likely to be followed by inflammation and the formation of pus or matter than are clean cuts. (Note. The germs have not been carried to the deeper parts of the wound.)

4. INFECTION BY HANDLING OR WATER.

If the wound is touched by the hand billions of pus germs will be carried into it. If washed with water even more germs will be carried into the wound and not only that, but the deep parts of the wound which previously no germs had reached will have billions of germs carried to them. Therefore do not handle or wash a wound. Even if an antiseptic solution is used it will carry pus germs from the skin and deeper than they have been before and no antiseptic such as bichloride of mercury can be used strong enough to kill these germs, as it will then also destroy the cells of the body and so make them less able to fight the germs. Peroxide is specially dangerous in deep wounds as it carries pus germs everywhere and is not strong enough to destroy them.

5. HOW TO CARE FOR A WOUND.

Placing a clean dressing, which means a dressing that has been sterilized surgically (such as the Red Cross Dressing) on the wound will introduce no more germs and will not injure the delicate tissues of the body, exposed in the wound. Moreover, the flow of blood and blood serum (the liquid part of the blood) will be in the direction of the dressing, so the germs will be constantly going out.

This therefore, is the way to take care of a wound.

bad effects only appear later with the growth of the germs and the production of their powerful poisons.

These germs are so small that they can only be seen through a powerful microscope. What they lack in size they make up in numbers and they live outside of the body in countless millions. They do not float around in the air, so there is no danger from them in exposing a wound to the air. Pus germs are found on the surface of our bodies, on knives and other objects which cause wounds, in the dust of houses, in water, and also on surgical instruments and dressings unless special means have been taken to free them of germs or, in other words, unless they have been disinfected or sterilized.

The Wound

Suppose a wound is received, what happens? If pus germs do not gain entrance to it, there will be no inflammation and it will heal quickly and kindly; but if, on the other hand, the wound is infected by pus germs, this means that inflammation will follow, more or less matter will form, and there will be some absorption of poison from the wound which may result in the more severe forms of blood-poisoning and almost inevitable death. But as pus germs are so generally present, it might appear that under ordinary conditions they would always be carried into a wound when it is received, either from the surface of the body or by the object which caused the wound. This is true, but if only a few pus germs are so carried into the body certain cells there will dispose of the germs without trouble and no harm will result; moreover, unless too many pus germs are carried into the body, the blood resulting from the injury will often wash so many out that the cells can dispose of the few left with little difficulty. This is exactly the reason why a wound which bleeds freely is less likely to prove dangerous. We should conclude, then, that every wound is *not* infected with pus germs and must use every care *not* to infect it by our hands, by water, dressings or anything else.

The symptoms of inflammation in a wound are heat, redness,

pain, swelling and partial or complete loss of use of the wounded part. These are the signs of wound infection and if these appear in a wound three or four days after an injury, unless they are slight a doctor is necessary, as they may grow much worse.

While the breaking or piercing of the skin is what distinguishes wounds from other injuries, in wounds there is also, of course, more or less damage to the parts of the body beneath the skin. As blood-vessels are found practically everywhere in the body they are always injured in a wound and some bleeding results. Usually—in about ninety-nine cases out of a hundred—this bleeding is not severe and may be checked by the pressure of an ordinary wound dressing. In nearly all wounds therefore what we must specially look out for is to prevent germs getting in.

Varieties of Wounds.—1. Cut or incised wounds, in which the skin and underlying tissues are cleanly divided by a sharp instrument. They are caused by razors, sharp knives, glass and the like. In this variety of wounds, as blood-vessels are cleanly cut across, there is likely to be severe bleeding.

2. Torn or lacerated wounds, in which the tissues are torn rather than cut. They are caused by a tearing or crushing injury, such as the blow of a blunt instrument, by machinery or by being run over or struck by a wagon, trolley or railway car. With them, as the blood-vessels are crushed as well as the other tissues, severe bleeding is not nearly so likely to occur as in the preceding variety, but on account of the character of the injury, dirt is likely to be ground into the tissues and they are so extensively torn and destroyed that infection followed by inflammation and matter or pus is extremely common.

3. Punctured wounds are deep wounds of small size produced by sharp-pointed instruments, such as daggers, bayonets and the like. Wounds caused by bullets are also included in this class. Wounds of this variety are, of course, frequently purposely inflicted, but the great majority of bullet wounds in civil life result from carelessness which is almost, if not quite, criminal. "I didn't know it was loaded" is not sufficient excuse for shooting a fellow-being, and if one observes the rule of never pointing a gun or pistol at himself or at anyone else he will have

no occasion to make this excuse. The amount of bleeding in this variety of wounds is often slight, but may be great if a large blood-vessel is injured. Infection is not uncommon, as pus organisms when carried into such wounds are best situated to increase in numbers.

Symptoms of Wounds.—The wound itself. Pain. Bleeding. Shock.

Treatment of Ordinary Wounds.—(This refers to the vast majority of wounds in which as previously noted bleeding is slight. For the treatment of severe bleeding see next chapter.) In deep wounds or those which cover a considerable surface, always send for a doctor at once. It is always better to call in a physician if you doubt your ability or resources. Treat shock. In all wounds if necessary cut or rip clothing so as to get a view of the wound. Turn back the clothing so it does not touch wound. Do not touch wound yourself nor allow the wounded person to touch it. Remember there is no hurry, for air will not infect the wound. If a physician may be expected to arrive within a few moments, it will usually be necessary to do nothing further. Exposure to the air is much safer than the application of anything which is not surgically clean or antiseptic. If, however, you have a surgically clean or antiseptic wound dressing, apply it to the wound at once and bandage firmly into place. This will prevent accidental contamination and will usually stop any bleeding there may be.

Water is dangerous as it contains many pus germs. Strong antiseptics such as bichloride of mercury or carbolic acid will destroy the cells of the body which dispose of the pus germs before they kill the latter and should never be used. Peroxide of hydrogen is not strong enough to kill germs and in a large or deep wound it washes them to uninfected parts which then become infected. Therefore, use none of these things but cover the wound to keep out pus germs.

What has been said applies to all kinds of wounds and the treatment given is a good one for the little cuts or scratches which are so common. But these, especially if they do not go through the skin, are rarely dangerous. We do hear from time to time of

some one dying from blood-poisoning as the result of the scratch of a pin but many thousand such slight injuries are received which are recovered from with or without treatment. Inflammation of these slight wounds is not particularly uncommon, however, and this should be prevented if possible. They rarely bleed much and making them bleed so that the blood will wash out the germs is the best thing to do first. Do not suck them as very dangerous pus germs are found in the mouth. Squeeze them well at the sides. With a finger it is well to encircle the finger near the hand with the thumb and finger of the other hand and then to work down with strong pressure, pushing all the blood in the finger ahead of the encircling thumb and finger of your other hand. This is sometimes called milking the finger. After the blood has been squeezed out a piece of clean gauze makes an excellent dressing. These small wounds may be safely washed with peroxide before a dressing is put on as with them there is no danger of pus germs being washed into deep parts. Collodion may safely be used on a shallow, cleanly cut wound but if the wound becomes inflamed it must be removed as this shows pus germs have been sealed up and are multiplying and producing poison. The use of plaster (except court plaster to cover a trivial scrape not involving the entire thickness of the skin) must be absolutely condemned, for not only does plaster seal the wound so any germs within will be in most favorable position to increase in numbers but is itself likely to be covered with pus germs.

More about Wound Dressings.—A wound dressing consists of everything which is used to cover or to dress a wound. The pad which is put directly on the wound is called a compress. In ordinary emergency treatment a bandage is put on immediately over the compress and this is all that is necessary. With much bleeding it is better, if you have it, to put a layer of absorbent cotton over the compress and then to bandage. It is important that the compress should not only be large enough to cover the wound but to lap an inch or so on each side. Do not forget that the compress is the most important part of the dressing. It is the inside we are looking after, not the outside and a

beautifully applied bandage will not make up for a dirty or poorly applied compress.

Surgeons commonly say dressing materials are clean or dirty. They mean surgically clean for the former, that is to say, the germs in them have been killed by some means. Every material is dirty in the surgical sense if the germs have not been killed. Surgically clean, sterile, or antiseptic dressings as they are variously called are, of course, the only kind that should be applied to wounds.

Most things required by the first-aider can be made. As will be seen, however, the process of making good wound compresses is complicated and it is much safer to have such articles ready at hand.

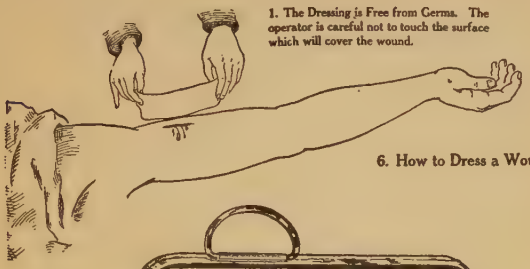
Of course it not only is necessary that the germs be killed at the time a wound compress is made but when it is put on the wound that it has not been contaminated in the meantime and that it can be handled at that time without being contaminated.

The necessity for a safe dressing for wounds led to the making of the American Red Cross First-aid Outfits.

In each of these outfits is found a long gauze bandage with a compress of gauze sewn to it in the center, a triangular bandage printed so as to show how to apply it, and two safety-pins.

The directions, which are also found inside the case, are as follows:

"*Gauze Bandage with Compress.*—If there is a wound or any injury in which the skin is broken, this bandage and compress are used by unfolding the bandage, **being careful not to touch the inner surface of the compress.** The compress should then be placed directly on the wound or injury, and held in place by wrapping the ends of the bandage around the limb in opposite directions and tying them or pinning them in place. With a very large wound which the compress will not cover, apply it to the middle of the wound and wrap the bandage around as before. In this case be careful not to touch any surface of the bandage which is placed on the wound. In case there is no wound, this bandage may be used like an ordinary bandage to hold splints in place, etc.



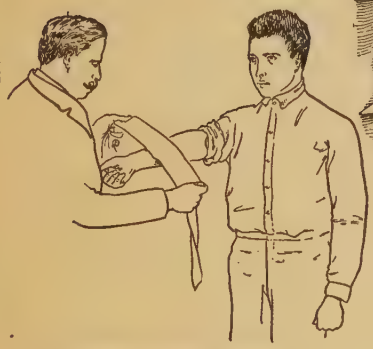
1. The Dressing is Free from Germs. The operator is careful not to touch the surface which will cover the wound.

6. How to Dress a Wound

NOTE. This Dressing is hermetically sealed and is protected from any accidental contamination before being used, so that you KNOW it is safe to put on a wound.

7. Red Cross First-Aid Outfit

8. Red Cross First-Aid Outfit
(Showing Contents)



A Compress is Sewed in the middle of a long bandage which is so folded that it is impossible to touch the surface of the compress which will cover the wound except through gross carelessness.

9. How to Apply Red Cross Compress

PLATE X.—Surgical dressings.

"*Triangular Bandage.*—The triangular bandage may be used as an outer bandage or as a sling in the manner pictured on it. This bandage should also be tied or pinned in place.

"Do not touch an open wound with the fingers, water, or anything except the compress, or when very large the untouched surface of the bandage.

"The pressure of the bandage will stop ordinary bleeding."

The advantages of this outfit are that the contents are always clean and ready for use, the dressing may be easily applied, and not only does it contain a dressing, but also a sling. With it and materials for splints which may usually be easily obtained you are ready for any ordinary injury.

A number of other first-aid packets are on the market which contain compresses that may be safely applied to a wound, though none is quite so easy to handle without accidental contamination as the Red Cross outfit. Each has printed directions on the box or container which must be carefully followed.

If a first-aid packet can be procured it should always be used in preference to anything else to dress a wound. The next choice should be sterile or antiseptic gauze. Small packages of such gauze suitable for compresses may be bought in most drug stores, and are found in emergency cases. (Sterile gauze is ordinary gauze in which the germs have been destroyed by heat, and antiseptic gauze is ordinary gauze in which germs have been destroyed by an antiseptic, usually bichloride of mercury.) In a city, therefore, or if an emergency case is available, one may easily procure a safe compress and all he need do is to handle it so that he will not contaminate it. This may be accomplished by holding it not with the fingers, but by the paper which covers it, allowing only the inner surface of this paper to come in contact with the gauze and never removing part of the paper until it has served this purpose. If, by chance, the gauze is touched by the hand great care should be taken to drop the untouched part on the wound and to place the gauze which has come in contact with the hand as near the outer layer of the compress as possible.

As stated, unless a safe gauze can be procured it is much safer to leave a wound exposed to the air than to cover it, but this will

not always prove practical. It is especially in places where no gauze for compresses can be procured that circumstances render it necessary to cover wounds. In such localities it may be hours before the services of a doctor can be procured, so an uncovered wound will be exposed for a long time to accidental contamination, which will be almost inevitable from the hands or clothing of the injured person who must perhaps be moved. A compress, too, affords an excellent means of checking bleeding, being often all that is required for this purpose.

Under such circumstances, therefore, it will be necessary to make a compress which, if not as safe as is desirable, is, at least, as good as can be procured. First, as surgically clean cloth for the compress as can be obtained should be used. This will be found in a towel, a handkerchief or other cloth of the same kind which has recently been laundered and has not been used since it was washed. Preferably, this cloth should be boiled for ten minutes or soaked in a solution of 1–1000 bichloride of mercury, corrosive sublimate, for an equal length of time. (Tablets of corrosive sublimate are in common use; they are known as antiseptic tablets. This substance is a deadly poison and its solution cannot be made in metal vessels.) The process recommended will give a compress which is safe to use, but an important practical difficulty is presented in applying such a compress to a wound. It will, of course, be so wet that it will not be possible to put it on the wound without squeezing some of the water out of it. To do this the compress must necessarily be handled and, as has been explained, pus germs exist in countless millions on the hands.

If possible, the hands must be cleaned surgically, which means they should be freed of germs. This should be done by hard scrubbing for five minutes with hot water, soap and a nail-brush, paying special attention to the nails. Preferably the hands should be washed under a tap instead of in a basin, and if a basin is used the water had best be changed two or three times. As a further precaution, when corrosive sublimate is procurable, the hands after being washed should be soaked in a 1–1000 solution of that chemical for a period of five minutes.

The hands must not be wiped and they must not touch anything except the compress. The piece of cloth which is intended for a compress may now be taken from the vessel in which it has been boiled or disinfected, but in so doing the operator should be very careful not to allow his hands to touch that part of the compress which he intends to put on the wound. On the contrary, he should pick up the piece of cloth by its outer surface and, holding it at all times by this, squeeze the water from it until it is comparatively dry and then put it on the wound without delay. If a fairly large piece is taken for the compress and if, previous to boiling, or disinfection, it is folded so as to fit the wound it will be handled much more easily and safely.

When no facilities are available for washing and disinfecting the hands, this naturally must be omitted, but the same precautions should be taken in handling the compress. Suppose, however, that in addition the compress cannot be boiled or disinfected, and yet it is absolutely necessary to have one. In this case one should again take a towel, handkerchief, etc., which has just been laundered, and without unnecessary handling apply its inner surface to the wound. Towels, handkerchiefs, etc., which have been used or handled, though they may look clean, are never so in the surgical sense and are therefore particularly dangerous to use as compresses.

Special Wounds

Abdominal Wounds.—All wounds should be treated on the general principles already described. A word or two is required, however, on the subject of abdominal wounds in which more or less of the abdominal contents escape through a large cut. Send for a doctor at once. Place a clean cloth over the wound and keep it constantly wet with a weak solution of salt and water, for if these delicate structures become dry they will suffer almost fatal damage from this cause alone. Boiled water is the only safe water to use for this purpose but if you cannot boil the water you will have to use the cleanest water available. Treat shock.

Wounds in which Foreign Bodies Remain. Treatment.—Such bodies should be gently pulled from the wound in a direc-

tion contrary to that in which they entered. If they are of considerable size and have damaged the tissues a good deal, the wound should be shown to a doctor at the earliest opportunity.

With a splinter of wood, the commonest of such foreign bodies:

Pull the splinter from the wound with a pair of pincers or by putting a knife blade against it and holding it on the blade with the thumb-nail.

The same method may be used with a splinter under the nail. But if it is broken under the nail, scrape the nail thin over it and cut out a small V-shaped piece so as to reach it.

Small splinters in the skin may be removed by a needle. In order to avoid possible infection it will be much safer to wash the skin with hot water and soap and to pass the needle through a flame before using it.

A wound from which a foreign body has been removed should never be sealed with plaster or collodion.

Eye Wounds, Including Foreign Bodies in the Eye.—The eye is the organ of sight. It is a ball surrounded by three coats. Covering the eyeball in front is a delicate membrane called the conjunctiva. Protection to this membrane is afforded by the eyelids when they are closed, but when they are open it is very liable to injury and to the entrance of foreign bodies. These are commonly spoken of as "something in the eye." On account of the sensitiveness of the conjunctiva, they cause much pain and distress. The eyeball itself is well protected from injury, as it is situated deeply in the head and the brows overhang it. Pointed objects may, however, enter it. When this occurs severe damage almost always results.

The symptoms are severe pain and redness of the eye, and if a wound has been inflicted it is usually easy to see the cut. Such injuries should be treated by a doctor. Therefore, in any injury of the eyeball, cover both eyes with absorbent cotton or soft cloths, soaked in cool water, so as to keep the eyelids still, and bandage them into place with bandages around the head. Be careful not to put on these bandages so tightly that they will press on the eyeballs, and in order to prevent inflammation keep them constantly wet with cool water until the services of a doctor

can be procured. While boiled water is safer for this purpose there is little danger in the use of any clean water.

Splinters in the eye should be pulled out if possible. If they cannot be removed, put a few drops of olive or castor oil in the eye. Whether removed or not, the eyes should be treated in the manner just described and a doctor should be consulted as soon as possible.

Foreign bodies in the eye are usually cinders, sand or particles of dust. They cause a great deal of discomfort and pain, and tears, which, fortunately, often wash them out.

Never rub the eye, as this will be likely to rub the foreign body into its delicate covering.

First, close the eye so that the tears will accumulate and the foreign body will frequently be washed out or into view, so that it may be easily removed. If this fails, pull the upper lid over the lower two or three times, close the nostril on the opposite side with the finger and have the patient blow his nose hard.

If the foreign body still remains in the eye, examine first under the lower, then under the upper lid. For the former, have the patient look up, press the lower lid down and if the foreign body is seen brush it off with the corner of a clean handkerchief. The upper lid is not so easy to see. Seat patient in a chair with his head bent backward. Stand behind him and place a match across the upper lid one-half inch from its edge. Turn the upper lid up and back over the match and brush off the foreign body as before. A few drops of castor oil in the eye after removing a foreign body will soothe it.

Above all things do not be rough, however, or you may do very serious injury. If you experience any difficulty in removing any speck from the eye it is much safer to bandage a pad wet with clean water on it and to take the patient to a doctor.

Lime in the eye may be neutralized by bathing it with a solution of vinegar, a teaspoonful to a cupful of water. Particles of lime large enough to be seen should be removed like other foreign bodies.

Poisoned Wounds.—This name is given to wounds into which a poison other than pus germs is introduced. Special treatment

is necessary in order to remove and combat the effects of this poison on the body. Snake bite, bites of dogs and cats, lockjaw and stings and bites of insects and spiders will be discussed here.

1. Snake Bite

Snake bites are rare injuries in this country, but bites from poisonous snakes are so rapidly fatal if not promptly given proper attention that it is necessary for the student of first aid to know how to treat them. The rattlesnake and the moccasin are probably most generally to be feared in the United States.

Prevention.—When it is impossible to avoid the localities where poisonous snakes are commonly found, comprises the wearing of high boots or leggings by day and sleeping on a cot or raised platform at night instead of on the ground. The Mexican plan when sleeping on the ground of surrounding the sleeper with a hair rope or lariat is undoubtedly a good one, as snakes will not cross such a rope.

Symptoms.—Great pain in the wound. Rapid swelling. Much depression and weakness, followed promptly by death in some cases unless proper treatment is given.

Treatment.—Immediately tie a string, handkerchief or bandage between the bitten part and the body if this is practical. Naturally, this can only be done in the limbs. This cutting off of the return of the blood to the body, of course, prevents absorption of the poison. The wound should then be soaked in hot water if this is obtainable and in any event squeezed, milked, or sucked. This is for the purpose of extracting as much poison as possible. Sucking the wound is not dangerous unless one has cuts or scrapes in the mouth. These procedures should not be delayed for a moment in order to send for a doctor but one should be summoned as soon as possible. The further first-aid treatment consists of burning or cauterizing the bite with ammonia. Strong ammonia should be used for this purpose. The patient should also be dosed with stimulants. It is not necessary to give whisky or brandy so as to intoxicate him. But a large drink of whisky or brandy or a big dose of aromatic spirits of

ammonia should be given at once and should be repeated as often as seems necessary to keep up the strength. Do not be afraid to give too much, for persons bitten by poisonous snakes require a large amount of stimulants.

Leave the string or bandage tied above the wound in place as long as you dare. After an hour, however, you must remember your tight bandage is likely to cause mortification as it has cut off the circulation. It must therefore be loosened. Never try to remove it all at once but loosen it a little so that only a small amount of poison will be carried into the body, then tighten and repeat after a few moments if the patient does not seem to be greatly affected by the poison. In this way you may finally be able to remove the constricting band entirely. But, on the other hand, if the poison which escapes into the body seriously depresses the patient you must keep the bitten part tied off and take chances on mortification.

2. Dog and Cat Bites

The teeth of a dog, and to a less extent those of a cat, make a rather nasty lacerated wound. These are treated like all other similar wounds unless the biting animal is rabid or is suspected of being rabid. Rabies is, of course, the same as hydrophobia. Cows, horses, wolves, foxes and deer also have hydrophobia.

The first thing to do for such a bite is exactly like that for snake bite: tying off, hot water and squeezing to encourage bleeding, and then burning. Of course a red hot wire may be used for burning the wound as well as strong ammonia or nitric acid. Lunar caustic, though so commonly used, is not of much value.

As soon as the bite has been cauterized, remove the constricting band and dress like any wound. Treat shock.

When possible it is best to have a doctor see such bites at once. But in any event you should never neglect consulting him as early as practical on account of the dangers of hydrophobia, which is a terrible disease that may be easily prevented but is never cured.

3. Lockjaw

The scientific name for this is tetanus. It is due to a special germ which takes time to develop in the body so just as with pus germs nothing wrong is noticed immediately after a wound is received. The point to be remembered is, however, that lockjaw can be prevented by proper treatment but that it is almost never cured. Lockjaw develops particularly in ragged torn wounds into which dirt has been ground and sometimes in wounds due to rusty nails. It is much safer to have a doctor see such wounds as soon as possible.

4. Stings and Bites of Insects and Spiders

These are rarely dangerous to life, though they may cause a great deal of pain and discomfort. Ammonia should be immediately applied to the part where the sting entered; this should be removed if it remains in the wound. Afterward cool, wet dressings should be used. Cloths wet with water in which a very few drops of carbolic acid have been thoroughly mixed, wet salt, and wet earth are all good applications.

QUESTIONS

1. What is a wound?
2. What is the special danger to be feared in a wound?
3. How does the skin protect the body?
4. What is the difference in the effect produced on the body by a mechanical or a chemical cause and by germs?
5. How can a germ enter the body?
6. Where are the germs found?
7. What does disinfection mean?
8. What happens in a wound if germs gain entrance to it? If they do not gain entrance to it?
9. How does free bleeding diminish the danger of wound infection?
10. What is inflammation?
11. What is blood-poisoning?
12. How would you prevent pus germs entering a wound?
13. What are the symptoms of inflammation in a wound?

14. When do they come on and what should you do if they appear?
15. What are the varieties of wounds?
16. What are the symptoms of wounds?
17. How would you treat an ordinary wound?
18. Why should one try to make a trivial wound bleed?
19. What dressing would you prefer to use for a wound?
20. How would you prepare a wound dressing?
21. State what you know of the use of: Strong antiseptics; peroxide of hydrogen; collodion; plaster.
22. What is the treatment for an abdominal wound?
23. What do you understand by foreign body?
24. How would you treat a wound in which there is a foreign body?
25. How do you treat an eye wound?
26. How would you remove a speck from the eye?
27. What are the dangers in removing foreign bodies from the eye?
28. What are poisoned wounds?
29. What would you do for a snake bite?
30. What is hydrophobia and how is it caused?
31. What is lockjaw? How is it prevented?
32. What is the treatment of bites and stings?

PRACTICAL EXERCISES

1. Show wound dressings and their method of application.
2. Have each member of the class put on such a dressing in such a way that neither the dressing nor the wound is contaminated.
3. Show how to treat a snake bite.
4. Show the way to remove a foreign body from the eye.

CHAPTER V

BLEEDING

As stated under the head of wounds in ninety-nine cases out of a hundred exposure to the air or the pressure of the dressing is all that is necessary to stop bleeding. Do not become hurried or alarmed when there is a little bleeding but, on the other hand, remember that if much blood is being lost you must check it promptly or the injured person may soon be beyond human aid. In order that one may know how to stop severe bleeding it is necessary to know something of the heart and the blood-vessels, of the course of the blood and of the blood itself, and these will now be described.

The Heart.—In order that the blood may reach all parts of the body it is, of course, necessary that some force shall propel it. This is provided by the Heart, which is not the seat of the feelings, but a most skillfully devised pumping machine.

The heart is about the size of a man's fist and is located in the chest between the lungs. It is a hollow, muscular organ, with valves which close and prevent the blood from flowing backward, all its force being expended to send the blood forward. The beat of the heart which we feel in the chest is its contraction by which it is made smaller inside, thus forcing the blood to the furthest parts of the body. After the heart contracts it dilates or becomes larger inside and the valves open so that it may fill with blood. The next contraction again forces the blood forward, and so on as long as a person is alive.

The heart contracts usually about 72 times per minute.

While, as has just been stated, the heart is a pump, it is not a single but a double pump, being divided into two entirely separate halves by a muscular partition. The left side of the heart,

or the left pump, drives the blood through the body, and the right side drives it through the lungs alone.

Blood-vessels.—A series of closed tubes, or blood-vessels, as they are called, carry the circulating blood. They are of three classes: 1, Arteries; 2, Capillaries, and 3, Veins.

1. **Arteries.**—Leaving the left side of the heart is the largest artery in the body—the Aorta. This strong tube is just about large enough so that a man's thumb may be introduced into it when it is separated from the heart. It soon divides into branches which again branch and rebranch, the branches constantly growing smaller in size, to reach finally the furthest parts of the body. It should be remembered, too, that the smaller branches of the arteries join freely with one another. The blood passes from the heart to the aorta and thence to the smaller arteries, not in a steady stream but in waves, each of which is produced by a contraction of the heart. The beat of these waves causes the Pulse, which may be felt not only at the wrist and temple, but also anywhere else an artery is near enough the surface of the body. Naturally, if an artery is cut, there will not be a steady stream flowing from it, but the blood will be expelled in spurts or jets. Arteries, especially those of large size, remain open when divided.

As the course of the blood in the arteries is away from the heart toward the limbs and the head, if an artery is cut, in order to stop the bleeding the artery must be compressed either on the side of the heart or on the bleeding point itself. Pressure on the further side of the cut will, as may be easily understood, do no good so far as stopping bleeding from an artery is concerned. It is also necessary to press on the artery on the near or heart side as close to the bleeding point as possible. This is because arteries in their branching and re-branching join each other, and if pressure is made on any artery far above the bleeding point, so many branches may bring blood into it between the point of pressure and the bleeding point that a great deal of blood will be lost, notwithstanding the fact that the main branch is blocked by pressure at a distant point. However, it is not in every part of the body that arteries lie near enough to the surface to be

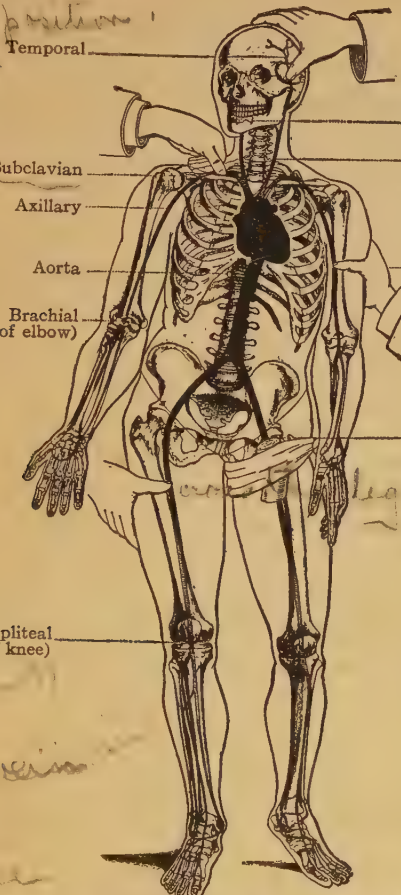


PLATE XI.—The arteries and pressure points.

compressed in their course. Moreover, it is necessary in compressing an artery to select a point where a nearby bone gives a hard surface to press against. Therefore, the student of first aid must know, first, the situation and course of the principal arteries and, second, the points on which pressure will be effective.

The aorta has three great branches which are of particular interest to the student of first aid. One of these, the Carotid, supplies the head and neck with blood; the second, the Subclavian, the upper limbs; and the third, the Femoral, the lower limbs.

The table which follows gives certain necessary information regarding these arteries and their branches.

Arterial bleeding is always more serious than other bleeding because blood is so rapidly lost being forced from the cut artery in jets with every beat of the heart. The blood which spurts from an artery is always bright red in color.

2. **Capillaries.**—The arteries, as they go further and further from the heart, become smaller and thinner-walled, till they finally end in still smaller vessels which are called capillaries, from the Latin word meaning a hair. The capillaries form a delicate network of vessels everywhere, and give the rosy color to the skin. Slight pressure on the skin will cause a white spot to appear. This is because the pressure has forced the blood from the net-work of capillaries and the white skin is seen instead of

HEAD AND NECK

Artery	Course	Point on which to make pressure
Carotid.....	From upper, outer edge of breast-bone to angle of jaw.	Deep. Down and back, an inch to the outer side of Adam's apple.
Temporal (a branch of carotid).	Upward, one-half inch in front of ear.	On skull, immediately in front of upper part of ear.

UPPER EXTREMITY

Artery	Course	Point on which to exert pressure
Subclavian.....	Across the middle of first rib to arm pit.	Deep. Down and back over center of collar-bone on first rib. Shoulder should be drawn down first.
Brachial (a branch of a branch of the subclavian).	Descends along inner side of big muscle at front of upper arm; about line of seam of coat, to just below center of crease at bend of elbow.	Against bone of upper arm by grasping and pulling big muscle to outer side. Or at elbow by putting a tight roll of cloth or a rolled bandage in bend of elbow, and bending up arm as much as possible.

LOWER EXTREMITY

Femoral.....	Down thigh from pelvis to knee, line from middle of line between point of hip and center of pelvis in front to inner side of knee.	Against bone of thigh high up inner side in line given about three inches below upper end of line.
Popliteal (a continuation of the femoral).	Down in middle of space at the back of knee-joint.	In bend of knee as described for elbow.

the rosy color due to the presence of the blood in the capillaries. In capillaries the pulse, or contraction wave from the heart, is no longer apparent, as these fine, hair-like tubes break up the waves. Slight cuts or pricks of the skin divide some capillaries

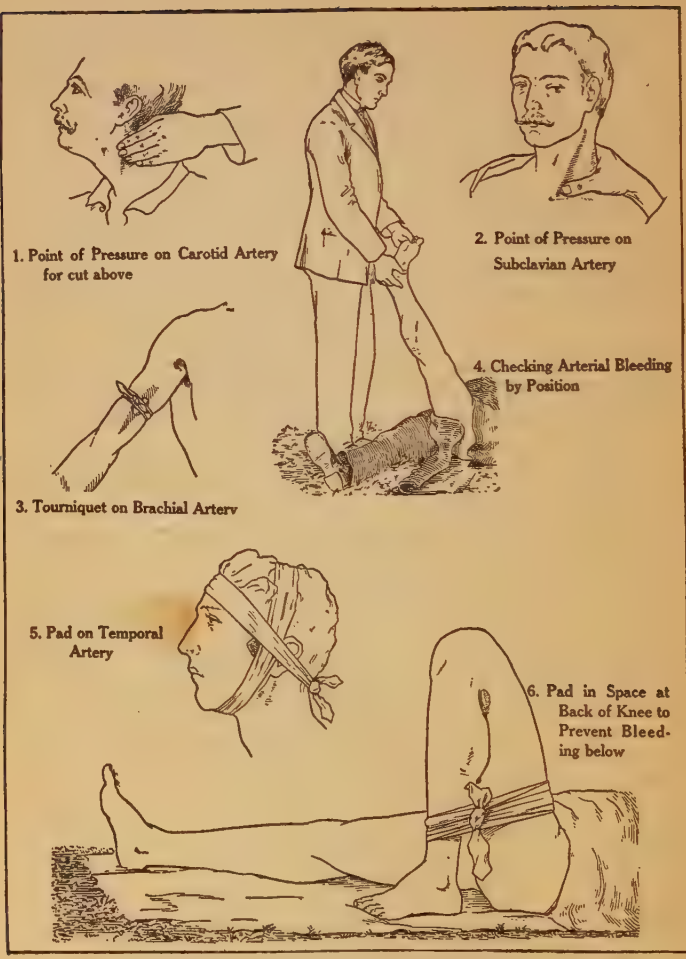

1. Point of Pressure on Carotid Artery for cut above
2. Point of Pressure on Subclavian Artery
3. Tourniquet on Brachial Artery
4. Checking Arterial Bleeding by Position
5. Pad on Temporal Artery
6. Pad in Space at Back of Knee to Prevent Bleeding below

PLATE XII.—Stopping bleeding.

and therefore cause bleeding. Naturally, on account of the minute size of these vessels, bleeding from them, except from a very large surface, is not dangerous to life. Capillaries branch so freely that pressure used to check capillary bleeding, to be effective, must be made on the bleeding point.

The blood lost from capillaries is no longer bright red in color like that from arteries, but is somewhat darker.

3. **Veins.**—The blood-vessels which return the blood to the heart from the points furthest from it are called veins. They may be easily recognized as the blue lines under the skin. Capillaries unite to form small veins, these unite to form larger veins, and finally these vessels become very large before entering the right side of the heart. The best known of the large veins is probably the jugular vein of the neck.

Bleeding from a cut vein is in a continuous flow instead of in jets as is the case with bleeding from arteries, and it is mainly through this difference that one distinguishes venous from arterial hemorrhage. Venous blood, too, is dark, bluish-red in color, as the oxygen in the blood is lost in its passage through the capillaries. While bleeding from veins has not the almost terrifying appearance of arterial bleeding, a dangerous amount of blood may be lost from a large vein. As the course of the blood in the veins is toward the heart, in stopping bleeding from them pressure must never be made on the side toward the heart, but on the bleeding point or on the side away from the heart.

The Blood.—The blood is a fluid which carries properly prepared food, oxygen, and heat to feed and warm all parts of the body, from which it also removes waste materials for final expulsion. These processes go on constantly as long as life lasts. Coagulation or clotting is the property of the blood which is of most interest to the student of first aid. While the blood is circulating in the living vessels it remains fluid, but as soon as this influence is removed it coagulates or clots, thus tending to stop bleeding. It is easy to see if Nature did not provide this safeguard that the slightest scratch sufficient to draw blood would result in the loss of all the blood in the body. The rate of loss would be regulated simply by the size of the opening just as is

that of water flowing from a pipe. Very rarely a person is found whose blood does not clot. These people are called "bleeders," and they often bleed to death from a trivial injury, such as the pulling of a tooth.

All efforts to stop bleeding have as their object clotting of the blood so that the clots will plug the bleeding vessels. Therefore, we must know the best way to help the clots to form. In order to clot, blood must be at comparative rest. A spouting stream of blood will never clot. This is one reason why bleeding from arteries is particularly dangerous. As soon as we stop the bleeding the blood begins to clot but not before. Any foreign material, especially if it has many points on which clots may form, will help in the formation of clots. Surgical gauze is a good example of such a material. Cobwebs are also, and they were much used even by surgeons before the danger of dirt in a wound was so well understood.

Symptoms from Loss of Blood.—Besides the actual appearance of blood in hemorrhage, the loss of a considerable amount of blood gives rise to certain symptoms: Faintness, with cold skin, pale face, dilated pupils, feeble, irregular breathing, sighing, weak pulse, dizziness and loss of consciousness. The severity of the symptoms depends on how much and how rapidly blood is lost.

Treatment of Wounds with Severe Bleeding.—Check the bleeding. Put the injured person in such a position that he will be least affected by the loss of blood. This is lying down with the head low so that the brain will get as much blood as possible. Do nothing which will increase bleeding. Violent movements must be prevented. When once the bleeding has ceased the injured person should remain quiet, as any movement may dislodge the clot and start it again. See that the patient gets plenty of good air, cover him warmly and put hot bottles around him if they can be obtained. Naturally, stimulants increase the force of the heart, so they are undesirable; but sometimes the injured person becomes so weak that it is absolutely necessary to give them to prevent him from dying. Whenever possible, always avoid doing so until the bleeding has been checked by some mechanical means. One-half teaspoonful of aromatic

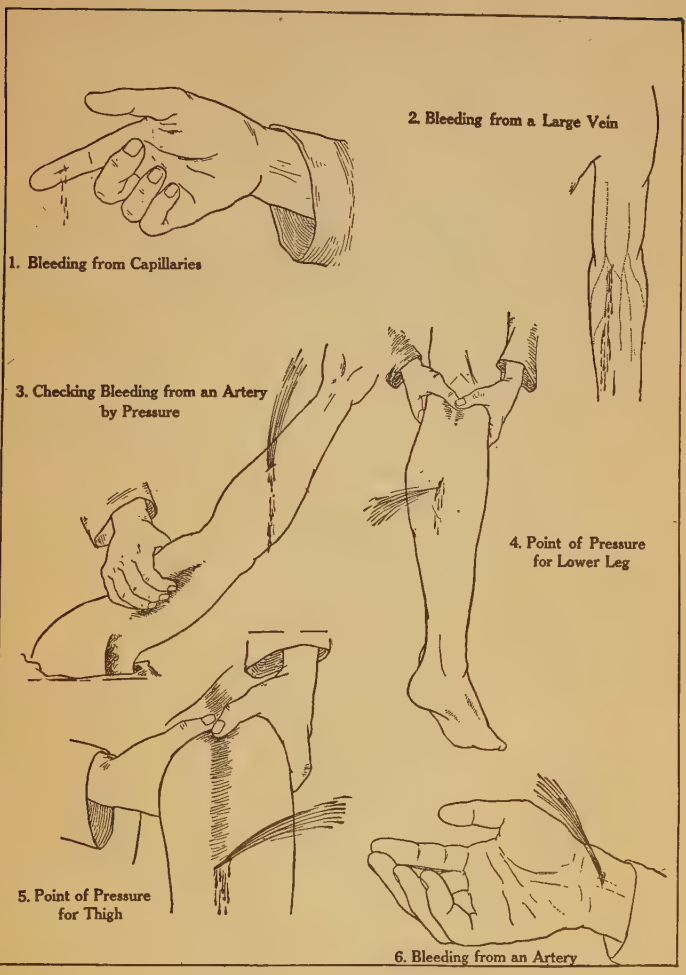

1. Bleeding from Capillaries
2. Bleeding from a Large Vein
3. Checking Bleeding from an Artery by Pressure
4. Point of Pressure for Lower Leg
5. Point of Pressure for Thigh
6. Bleeding from an Artery

PLATE XIII.—Bleeding.

spirits of ammonia in a tablespoonful of water or a tablespoonful of whisky are good stimulants.

When a patient is in a state of collapse from loss of blood his death may often be prevented by forcing the blood into the body from the limbs. This is done by raising the feet and bandaging the legs from the toes to the body and by bandaging the arms from the tips of the fingers to the arm pits.

In order to check bleeding it is necessary to know from which kind of a blood vessel it comes.

1. Arterial hemorrhage is recognized by bright red blood expelled in jets. The blood is lost very rapidly.

2. Venous hemorrhage is recognized by a steady flow of dark blue blood.

3. Capillary hemorrhage is characterized by the oozing of blood of a brick color.

Hemorrhage will not be severe except from arteries and large veins.

Naturally, as arteries, capillaries and veins may all be cut in a wound, there may be bleeding from all three. In this case arterial hemorrhage demands first consideration, and with venous and capillary hemorrhage the latter may be disregarded for the time being.

Arterial Hemorrhage

Treatment.—Send for a doctor at once. Do not wait for him, for by so doing the patient may die or be in a hopeless condition when he arrives. If necessary, cut off clothing at once so as to see bleeding point. In very severe bleeding take the next step before doing this. Press with your fingers or thumb on the artery between the bleeding point and the heart. This stops the bleeding just as you can check the water flowing from a hose by pressure in any part of its length. It does more than this, however. Nature's method of checking hemorrhage is by the formation of a clot, and as pressure prevents the washing away of the blood beyond the point of pressure an opportunity is given for a clot to form.

The points where pressure can best be made on arteries in their

course have already been given, but it will be best to say a few words more on this subject.

Bleeding from any part of the scalp may be stopped by a tight bandage around the head. This bandage should encircle the head, going across the forehead just above the ears to the back of the head behind.

Bleeding from the side of the head above may also be stopped by pressure on the temporal artery in front of the ear just above where the lower jaw may be felt working in its socket.

All arterial bleeding from the head except that already referred to and from the neck above had best be checked by pressure on the carotid artery. To make such pressure press backward with the thumb or fingers deeply into the neck just to the inner side of the plainly seen muscle which reaches from the upper part of the breast bone to behind the ear.

Wounds of the neck whether from arteries or veins are so immediately and extremely dangerous, however, that for them direct pressure on the bleeding point should be resorted to at once.

In bleeding from wounds of the shoulder or arm-pit, the subclavian artery may be reached by pressing the thumb deeply into the hollow just above and behind the center of the collar bone. (Plate XII.)

In bleeding from any part of the arm or hand, the brachial artery is usually pressed outward against the bone just behind the inner border of the large muscle of the upper arm. (Plate XII.) This artery runs about with the seam of the coat.

Another method is to put a firm pad of gauze or cloth about the size of a small egg at the bend of the elbow, to close the joint tight and to bandage in this position.

For the hand alone, pressure on the pulse at the outer side of the wrist and at the same place at the inner side will stop bleeding. Two little pads may be used for this.

While bleeding in the palm may be checked in these ways, direct pressure by means of a stone wrapped in gauze or the like firmly bandaged in the palm with the hand closed upon it is much better.

In bleeding from the thigh, leg or foot, press backward with the

thumbs at the middle of the groin where the artery passes over the bone. This is four finger breadths below the fold of the groin.

For bleeding below the knee, a pad about the size of a billiard ball is placed in the bend of the knee, the joint is bent on it and is bandaged in this position just as is done in the elbow-joint.

In making pressure with the fingers, if you feel the beat of the artery, you may be quite sure that with a little care to get it between your fingers and the hard point you can check the bleeding. If you have stopped the bleeding in the manner just described, you may also be quite sure that the patient is safe so long as you continue the pressure.

You will hardly be able to do this for more than ten or fifteen minutes, however, as your fingers will become tired and cramped. It will be best, therefore, in wounds of the extremities to have a tourniquet made to place around the limb against your fingers with the pad on the artery; the tourniquet then to be twisted, or in proper cases the elbow or knee pads may be used in place of the tourniquet.

One of these methods will usually be all that is necessary if the services of a doctor can be procured within two or three hours. If this is not the case you will be in a serious position. If either apparatus is left in place much longer than this there is considerable danger from cutting off the blood-supply that you will cause the death of the part below. No part of the body can do without blood for a long period. Yet if the pressure is removed the bleeding may recommence. Under such circumstances, therefore, leave the tourniquet or pad in position as long as you dare, say two hours. In the meantime procure an antiseptic compress or have one prepared in the manner already described. Place this gently on the wound and bandage firmly in place so as to make strong pressure on the bleeding point. The pressure between the heart and the wound may now be gradually released. If the bleeding does not recommence, well and good; if it does, the tourniquet or pad must be reapplied. Another attempt to remove it should not be made for at least an hour, as time is needed for the clot to reform.

Suppose, at first, and this is not wholly improbable, that you have failed to stop the bleeding by pressure between the heart and the bleeding point—there is still no reason why you should become panic stricken. Of course you do not want to put your fingers in the wound as this will be very likely to infect it, but in case of a severe arterial hemorrhage which you are unable to check by pressure between the heart and the bleeding point you must at once make pressure on the cut artery in the wound. If you have an antiseptic compress or a surgically clean cloth to put over your fingers, which are used to make direct pressure, so much the better, as this will prevent infection; but do not wait to obtain it. When direct pressure is made in this way, it should be replaced, if possible, by a compress bandaged in place in the manner which has already been described.

With wounds of the smaller arteries if a compress is firmly bandaged on the wound at the beginning it will often be all that is required to check bleeding. Position is also of value in stopping such hemorrhage. By elevating the arm or leg the heart is made to pump against gravity and a much better chance is given for a clot to form which will block the injured artery.

More about Tourniquets.—Tourniquets are instruments used to stop bleeding from arteries. Every tourniquet must have a strap to go around the limb, a pad to place on the artery and some means by which the pad may be made to press on the artery and thus to stop the flow of blood. In an improvised tourniquet, which is the type most commonly used, the strap may be made of a handkerchief, towel, bandage or cravat, and a smooth round stone, a cork or some object of similar shape and size may be used for the pad. The stone, or the like, had best be wrapped in a small piece of cloth so that it will not bruise the skin too much. It is then placed over the artery above the wound and the strap is best passed twice around the limb and tied loosely at its outer side. A stick is introduced between the two layers thus formed and is twisted around until the bleeding is stopped. If desired, another bandage may be used to loop over and to hold the end of the stick from twisting back and so relieving the pressure of the pad on the artery. One layer of

bandage may be used for the strap if more is not procurable. In order to avoid bruising in using this it is best after introducing the stick into the loop to twist away from the body.

The inner tube of a bicycle tire makes an excellent tourniquet. Its end is used for the pad.

Ready made tourniquets with straps, buckles, and pads may be bought. They are more convenient to use.

Besides the bruising of the muscles and skin which is certain to occur to some extent with any tourniquet, there is a much graver danger connected with their use. This, as has been explained, is due to the fact that in consequence of cutting off the circulation, mortification and death of the part may follow. Therefore, tourniquets should never be used except when necessary and they should be removed as soon as possible. In doing this loosen the tourniquet and allow it to remain loose if no bleeding occurs. It should not be removed as it may be necessary to tighten it again quickly should bleeding recommence.

Instead of tourniquets, appliances to make pressure on the whole circumference of a limb and thus to stop bleeding are sometimes employed. A special elastic bandage and elastic suspenders have been recommended. When possible, however, use the tourniquet, as cutting off the whole circulation by pressure on the entire circumference of the limb is much more likely to cause mortification than the tourniquet which only exerts hard pressure on the artery alone. If circular constriction is used it should never be employed for over an hour.

Venous Hemorrhage

(Large Veins)

Treatment.—Stopping bleeding of this character is rather simple as compared with checking arterial hemorrhage. Send for a doctor. Remove any bands, such as tight collars, belts, garters and clothing which prevent the return flow of blood to the heart. If a limb be wounded, elevate it so as to assist the flow of blood back to the heart.

Apply a compress directly to wound and bandage on tightly. If no compress can be obtained which is surgically clean or antiseptic, if bleeding is very severe it will be necessary to make direct pressure in the wound with the fingers. This will, of course, be done at the risk of infecting the wound. If possible, keep wounded part in an elevated position for some hours after bleeding has stopped.

With wounds of the neck, such as those caused in an attempt to cut the throat, some of the jugular veins are often divided. It is quite probable in such a case that death will occur before anything can be done. If not, jam the fingers on the bleeding point at once and replace them with a compress at your leisure. This compress should be bandaged tightly in place.

Varicose Veins are veins which have become very large from weakening of their walls. Only those of the legs need be considered here. They may burst from injury or without an injury, causing serious or even fatal hemorrhage if they are not given prompt attention.

Send for a doctor at once. Put patient on his back. Remove all bands around leg above bleeding point. Raise leg. Cut and rip clothing so as to get at bleeding point. Turn back clothing from wound.

Place surgically clean or antiseptic compress on bleeding point and bandage firmly in position, or when absolutely necessary use fingers first for direct pressure on the bleeding point and replace them by a clean compress. Keep patient lying down for some hours with the leg elevated.

If there has been considerable loss of blood, cover patient warmly and place hot bottles around him. Give stimulants only when absolutely necessary to prevent death, as they will increase the force of the heart and so the bleeding.

Internal Hemorrhage

May result either from a deep wound which cuts a large blood-vessel of one of the internal organs or from the bursting of a blood-vessel of the lungs or stomach.

Symptoms.—Those of hemorrhage, but as the bleeding is internal it will not be seen.

Treatment.—Send for a doctor at once. Put patient in a lying-down position immediately, with his head lower than his body. Apply ice or cloths wrung out in very cold water to the point from which you think the bleeding comes. To distinguish between bleeding from the lungs and stomach, remember that from the former the blood is bright red and frothy and is coughed up, while from the latter it is dark and is vomited. Give stimulants only when patient is becoming very weak.

Nose-bleed

Usually this does not result from a wound, but comes on spontaneously. Slight nose-bleed does not require treatment, as no harm will result from it.

Treatment. Severe.—Place patient in a chair with his head hanging backward. Loosen collar and anything tight around the the neck. Apply cold to the back of the neck by means of a key or of a cloth wrung out in cold water.

Put a roll of paper under the upper lip between it and the gum. If bleeding does not cease, salt and water, a teaspoonful of salt or vinegar to a cupful of water, should be snuffed up the nose.

If bleeding still continues, send for a doctor to come at once. Before his arrival place a small piece of cotton or gauze in the nostril from which the blood comes and shove it in gently for about 1 inch. A pencil answers very well to push this plug in.

Pinching the soft part of the nose below the bone will also help to stop bleeding.

Stimulants should be used only as in the other classes of hemorrhage.

QUESTIONS

1. What is the purpose of the heart? Describe its action.
2. What is the heart beat and how often does it occur?
3. What are the different classes of blood-vessels; describe each.
4. What are the characteristics of bleeding from an artery?

5. In bleeding from an artery where would you press, and why?

6. Give the points of pressure for the following arteries: Carotid, Temporal, Subclavian, Brachial (2), Femoral, and Popliteal, and explain from what part of the body pressure on each would stop arterial bleeding. Tell exactly what you would do in bleeding from a large artery.

7. What are the characteristics of bleeding from capillaries?

8. How would you stop bleeding from capillaries, and why?

9. What are the characteristics of bleeding from veins?

10. How would you stop bleeding from veins?

11. What is the blood? What does it do?

12. Describe clotting of the blood?

13. What helps to make the blood clot?

14. What are the symptoms of great loss of blood?

15. What is a tourniquet? What are its uses and dangers?

16. How would you treat bleeding from a varicose vein?

17. Treatment of internal hemorrhage?

18. Difference between bleeding from the lungs and stomach?

19. Treatment of nose bleed?

PRACTICAL EXERCISES

1. Show the course of the arteries on the subject and the pressure points.

2. Show how a tourniquet is used.

3. Have each member of the class show how to stop severe bleeding from an artery or a large vein at the same time dressing the wound properly.

CHAPTER VI

INJURIES DUE TO HEAT AND COLD

Burns and Scalds; Sunstroke and Heat Exhaustion; Frost Bite and Freezing

BURNS AND SCALDS

Description.—Burns result from exposure of the body to dry heat, such as a fire, while scalds are produced by moist heat in the form of hot water, steam, etc. With either, the injury may be confined to the skin alone or it may extend deeper. With burns all the tissues of the body may be charred down to the bone and with scalds all the tissues may be actually cooked. With either the danger, which first of all is shock, will depend upon the depth, extent and part injured as well as on the age of the injured person.

In children and old people, burns and scalds are particularly dangerous. Both burns and scalds of the throat and windpipe often cause death, as the swelling of the injured part is likely to result in suffocation.

Causes.—Burns: Flames or fires, hot or molten metal, the electric current, explosions of gas or gunpowder, and strong acids and alkalies.

Scalds: Steam, boiling water or hot oil.

Prevention.—The prevention of burns and scalds is rather a complicated subject, as it involves: (1) Prevention of fires. (2) Putting out fires. (3) Rescue of persons at fires. (4) Extinguishing burning clothing. (5) Avoidance of danger from hot or molten metal. (6) Avoidance of electric shock; and (7) methods to prevent explosions of gas and gunpowder.

Prevention of Fires

Most fires result from carelessness. It would seem as though very few people would be foolish enough to take chances in this respect but hundreds of fires are caused yearly by lack of common sense. Throwing matches in paper baskets is not safe. Hot ashes in wooden boxes are a common cause of fires. Clothing hung too close to stoves often catches fire as soon as it dries. Fireplaces unguarded with screens frequently cause fires from burning cinders which snap out on carpets or rugs. Burning lamps under shelves are one of the commonest causes of fires. Defective wiring results in the loss of many homes.

Putting Out Fires

A fire almost anywhere may be easily put out when it starts, whereas a very few moments' delay may result in so big a fire that nothing can be done to subdue it until it has burned everything inflammable within reach. It is clear, therefore, that everyone should act promptly in case of fire.

At first a fire may be smothered by a few buckets of water or by throwing blankets or woolen clothing upon it. Sand, ashes or dirt will all quickly smother a fire. One of these should always be used instead of water on burning oil, as water will spread the oil and the fire. Anything hanging should, when possible, be pulled down before attempting to smother the fire in it. A bucket brigade will often prove valuable in putting out a fire. This should consist of two lines of men from the nearest water supply to the fire. The men in one line pass buckets, pitchers or anything else that will hold water from one to another till the last man throws the water on the fire. He returns the buckets to the water supply by the other line. Remember that a draft will fan a fire and therefore keep everything closed as much as possible to prevent drafts.

Rescue of Persons at Fires

While searching through a burning place it will be best to tie a wet handkerchief or cloth over the nose and mouth. Remem-

ber that the air within 6 inches of the floor is free from smoke, so when unable to breathe crawl along the floor with the head low, dragging anyone you have rescued behind you. Crawl backward in the same way down a staircase or any slope.

Extinguishing Burning Clothing

If your own clothing catches on fire when you are alone, do not run for help as this will fan the flames and make them burn fiercer.

Lie down on the floor and roll up as tightly as possible in a rug, shawl, overcoat, blanket or other woolen cloth, leaving only the head out. If nothing can be obtained in which to wrap up, lie down and roll over slowly, at the same time beat out the fire with the hands. If another person's clothing catches fire, throw him to the ground and smother the fire with a coat, blanket, rug or the like.

Avoidance of Danger from Hot or Molten Metal

Naturally, only persons working about them are subject to burns from these sources. Common care and watchfulness will do much to prevent them.

Avoidance of Electric Shock

Some general rules on this subject are given under the heading "Electric Shock."

Methods to Prevent Explosions of Gas and Gunpowder

The mixture of illuminating gas and air in certain proportions is a very explosive one. This is also true of the mixture of certain other gases with air. Any unprotected light will cause an explosion, so do not enter a room filled with gas with such a light.

In handling gunpowder it will be best to have no matches in the pockets, and lighted cigars, cigarettes, pipes and lights of every description are, of course, extremely dangerous.

Symptoms of Burns and Scalds.—Severe burning pain. De-

pending on depth of injury: Reddening of skin; formation of blisters, or destruction of the skin and some of the tissues beneath it. Shock, severe except in slight injuries.

Treatment.—When the skin is simply reddened:

Exclude air by a thin paste made with water and baking soda, starch or flour. Ordinary vaselin or carbolized vaselin, olive or castor oil, and fresh lard or cream are all good. One of the substances mentioned should be smeared over the burned part and on a cloth used to cover it. A light bandage should be put on to hold this dressing in place. The services of a doctor will hardly be required for such injuries.

When blisters have formed:

Treatment may be the same, but if the blistering is very extensive it will be best to show this injury to a doctor.

Destruction of the skin and some of the tissues beneath it:

Deep burns require prompt attention from a physician. Before his arrival they may be treated by the application of the dressing which has been described or like a wound. A specially valuable dressing material for such burns, or in fact for all burns, is picric acid gauze which is wet, in steam if possible, and is then applied in the form of a compress which should be bandaged in place like any other compress. Picric acid may increase burning slightly at first but will lessen it later. Be careful not to get it on the clothes as it will not wash out. In burns from wax or gutta percha do not try to scrape off.

Always remember and treat shock.

Besides the burns which have been described, burns are frequently caused by strong acid and alkalies. The symptoms of burns by acids and alkalies are the same as of burns caused by heat. With either, wash off as quickly as possible; best under a water tap.

Acids: While washing injury, have lime-water procured or make a mixture of baking soda and water or get soapsuds and apply freely. If acid has entered the eye, wash it as quickly as possible with water and then with lime-water. Alcohol is what should be used in burns from carbolic acid. Pour it freely on the burn.

Alkalies: Wash in same way as with acid burns. Neutralize with vinegar, lemon juice or hard cider. Lime burns of the eye should be washed with a weak solution of vinegar and water or with olive oil. With both acid and alkali burns, after neutralizing, treat like other burns. In severe burns of this character always see a doctor, and when either acid or alkali has entered the eye secure the services of a doctor as soon as possible. Treat shock.

The subject of electric shock is treated at length under the proper heading. The local effect produced by contact with an electric current is a burn. Such burns except those due to a flash are deep. It is easy to understand this as contrary to what is the case in ordinary burns, which affect the surface first and then the deeper structures of the body, an electric burn is due to a current of electricity which passes through the body burning everything in its course to nearly an equal extent.

Such burns are very slow in healing but they are not as painful as other burns as the nerves are destroyed. The direct current causes much severer burns than the alternating. The treatment of electric burns is the same as for other burns.

Warning.—In all burns, whatever the cause, use care in removing the clothing. When the clothing sticks to a burn, do not drag it off, cut around the part that sticks and soak it off later with oil. Never put cotton on a burn as it will stick just as the clothing does and it will be almost impossible to remove it later.

SUNSTROKE AND HEAT EXHAUSTION

Sunstroke

This is a condition produced by excessive heat. It is a very dangerous one.

Cause.—Sometimes due to direct exposure to the rays of the hot summer sun, especially when the air is moist.

Most commonly due, however, to somewhat prolonged exposure to excessive heat while working indoors, especially if overfatigued.

Too heavy clothing is likely to help to cause sunstroke, and hats and caps which do not protect the head from the sun are dangerous.

Drinking any kind of alcoholic liquor before physical exertion with exposure to the summer sun is very apt to result in sunstroke.

Prevention.—Avoidance of exposure to sun in middle of the day in summer. The best possible ventilation of workrooms in summer, and avoidance of overfatigue as far as possible. Light clothing for summer and light head-gear with space above head for ventilation. Avoid alcohol before exposure to sun.

If one feels the first symptoms of sunstroke he can often prevent actual sunstroke by stopping work, finding a cool place, lying down, bathing face, hands and chest in cold water and drinking freely of cold water.

Symptoms.—Usually before actual attack, pain in the head and feeling of oppression. Insensibility complete. Face red. Pupils dilated. Skin very hot and dry. No perspiration. Breathing labored and sighing. Pulse slow and full.

Treatment.—Consists in reducing temperature. Send for doctor. Remove at once to cool place. Loosen and remove as much clothing as possible.

Apply cold to head and body. To do this, cold water or ice should be rubbed over face, neck, chest and in arm-pits. Is still better to put patient in a very cold bath or to wrap him in sheets wrung out in cold water which should be kept wet and cold with water or ice. If this is done, must rub continually to prevent shock and to bring hot blood to surface.

When consciousness returns, may be allowed to drink cold water freely.

Cold may be discontinued when consciousness returns, but if skin again becomes very hot, must renew. No stimulants.

Heat Exhaustion

Though this condition is caused and prevented in the same ways as sunstroke, it is really quite different from it. Heat ex-

haustion is just what its name states—exhaustion or collapse due to excessive heat.

Symptoms.—Great depression and weakness but not really unconscious. Face pale and covered with clammy sweat. Breathing shallow. Pulse weak and rapid.

Treatment.—Send for doctor. Remove to cool place and have patient lie down in most comfortable position with clothing loosened. No cold externally, but may sip cold water. Stimulants, as tea, coffee, aromatic spirits of ammonia or small amount of brandy or whisky with a good deal of water.

FROST-BITE AND FREEZING

Frost-bite

This is due to the local effect of cold on the body, parts of which freeze much as do many other objects. The parts of the body which are most liable to frost-bite are the nose, ears, toes and fingers.

Cause.—Cold; insufficient clothing; general weakness with poor circulation of blood.

Prevention.—Protection of the body, especially the exposed parts named above with sufficient covering when it is necessary to expose yourself to intense cold.

Rubbing of any part of the body which becomes very cold in order to increase circulation, or the supply of warm blood to the cold part.

Symptoms.—In intense cold, frost-bite not infrequently occurs without one's knowing it, but usually the ears, fingers, etc., become painfully cold and then one suddenly realizes that they no longer have any feeling. The color of the frozen part is white or grayish-white.

Treatment.—Object: To gradually bring the frozen part to its natural temperature.

Rub with snow or cold water. Then use warm water gradually.

Warning.—The use of heat at once may result in mortification or death of the frozen part.

Freezing

This condition is produced by long exposure to extreme cold.

Cause.—Extreme cold. Effect of which is increased by over-exertion, hunger, alcoholic liquors and insufficient clothing.

Prevention.—If you expect to be exposed to extreme cold, procure warm clothing sufficient in amount to protect you from its effects. Do not attempt a long journey in the cold without food and do not make the journey so long that you are likely to have to stop and perhaps lie down on account of exhaustion. Do not drink alcoholic liquors, for though they give a temporary sense of warmth, you will be more easily overcome by cold after this effect wears off.

If caught out without shelter in very cold weather use all your energy to keep moving. Lying down under such circumstances almost always results in freezing.

Symptoms.—Surroundings should be taken into account. Depression is so great that appearance of patient is like that of a dead man.

Treatment.—Object is gradually to restore warmth to the body. Take patient into a cold room, rub limbs toward body with rough cloths wet in cool water; increase temperature of room if possible. This should be done gradually and cloths should be wet in warmer and warmer water. As soon as patient can swallow, give stimulant—coffee or tea in small quantities, frequently repeated with the addition of a little whisky, brandy, or aromatic spirits of ammonia.

Patient should not be placed before an open fire or in a hot bath until circulation has become active in cool room. You will know this by an increased force of the pulse, better breathing and more warmth and color in the skin.

QUESTIONS

1. What is a burn?
2. What is a scald?
3. Why are burns of the throat and windpipe specially dangerous?
4. What are the general principles governing the prevention of fires? Suppose a fire occurs, how would you try to put it out?

5. How would you rescue a person in case of fire?
6. How would you put out burning clothing?
7. What are the symptoms of burns and scalds?
8. Treatment: Very slight burns and scalds; where blisters have formed; very deep.
9. What is the treatment of burns from strong acids and alkalies?
10. What can you say of burns from electricity?
11. What is the difference between sunstroke and heat exhaustion? Treatment of each?
12. What is frost-bite? What are the symptoms of frost-bite?
13. How would you treat frost-bite?
14. How would you treat freezing?

PRACTICAL EXERCISES

Treatment of all classes of wounds and burns, with methods of checking bleeding by the class.

CHAPTER VII

SUFFOCATION AND ARTIFICIAL RESPIRATION: DROWNING; ELECTRIC SHOCK; GAS POISONING; HANGING

Suffocation is caused in different ways, but whatever the more remote cause, the immediate cause is always interference with the supply of good air to the lungs, and with the escape of bad air from the lungs.

Some knowledge of the Respiratory System is necessary in order that the subjects of this chapter may be understood.

The Respiratory System

This system consists of the Nose and Mouth, the Windpipe and the Lungs.

At the upper end of the windpipe is the Larynx, part of which we know as the prominent Adam's Apple in the throat. As the larynx is in front and the gullet is behind, food and water passing to the latter must pass over the upper end of the larynx and would enter it if some protection were not provided. This is afforded by the Epiglottis, a muscular flap or curtain which falls into position, covering the upper end of the larynx so that ordinarily food does not enter it. Sometimes, however, the epiglottis does not do this, especially if one swallows quickly or attempts to talk while swallowing. In this case choking results from food entering the larynx, or, in common words, one has swallowed the wrong way. The attempt to give food or water to an unconscious person will also result in choking him because his epiglottis does not close.

The Lungs are two soft, spongy structures, each of which is bag-like in shape and is made up of air cells with many blood-

vessels surrounding them; they are sometimes compared to a bunch of grapes. The lungs are hermetically sealed in the chest, so that when the cavity of the chest is increased or diminished in size, the same effect is produced on the lungs themselves. Certain muscles are of great importance in filling and emptying the chest and lungs. Ordinarily, the muscular movement consists simply of the bellows action of the chest and the up and down movement of the diaphragm. In order that the chest may be enlarged to its greatest capacity, however, some of the muscles of the upper extremity must also take part. In order that they may do so, the arms are raised vertically above the head, so that certain muscles attached to the chest wall and to the upper extremities will, when the latter are fixed, raise the ribs and thus enlarge the chest. The chest, too, is elastic and direct pressure upon it will diminish its size and so force the air from the lungs.

The rate of respiration is 16 per minute.

The lungs aerate or oxygenate the blood. The small blood-vessels surrounding the air cells which the pure air breathed in finally reaches, carry dark blood which has lost its oxygen in the body. This blood receives oxygen from the pure air and returns to the heart as bright arterial blood. The air which is expelled from the lungs has not only lost its oxygen to the blood, but has also received certain impurities from it.

From what has been said it is easy to understand that the nose and mouth and the windpipe are simply a passageway for the air going to and coming from the lungs. Naturally, anything which blocks this air in its course will interfere with the supply of air to the lungs and complete blockage will result in early death from suffocation or asphyxiation.

A special nerve center in the brain governs breathing just as other similar nerve centers govern other actions of the body. Paralysis of this center will stop the breathing as effectively and completely as blocking the passage of the air to the lungs. Water and some gases, such as illuminating gas, will also prevent good air entering the lungs and will thus cause suffocation.

Symptoms of Suffocation.—At first the lips, the face, the

tongue and the nails get blue while at the same time the suffocated person gasps and struggles for breath. The eyes are staring and show suffering. Later the struggle for air becomes greater with all the symptoms mentioned intensified. Regular convulsions come on in the fight to get good air. The last stage and, of course, this is often the only one seen, is complete unconsciousness, with stoppage of the breathing or an occasional gasping breath. The lips, face, tongue, nails, and in fact the skin of the whole body are blue.

Artificial Respiration

A suffocated person cannot get the good air into his own lungs and the bad air out but fortunately we can do this for him by certain movements imitating breathing. This is called artificial respiration. Before beginning it loosen all clothing so it does not bind the body anywhere. Keep everybody away; a suffocated person needs all the good air he can get.

Artificial respiration consists of alternate movements which diminish the size of the elastic chest, and then by relieving pressure permit it to regain its original size.

In some forms of artificial respiration the size of the chest is also increased by movements which put on the stretch the muscles from the arms to the chest.

The Schaefer or Prone Pressure Method of artificial respiration is now generally used, though the older Sylvester Method is still very popular. The advantages of the Schaefer Method are that by it a greater amount of air is gotten into the lungs, it is not necessary to hold the tongue out and it is much easier for the operator. Unless the operator is extremely rough no danger attends its practice. Of course, if either of the arms is broken, the Sylvester Method should never be employed.

In the Schaefer Method the patient is laid on the ground face down. The arms may be stretched out at full length over his head or one arm may be bent so the forehead rests upon it. In either case the face must be placed slightly to one side so that the ground will not block off the air from nose and mouth.

As soon as the patient is in proper position, the operator

kneels at one side, or astride his body but without resting his weight upon it. The palms of his hands are placed on the short ribs across the small of the back with the thumbs nearly together. The operator by letting his weight fall on his wrists by bending his body forward decreases the size of the chest and the air is expelled from the lungs. The pressure is then released by the operator swinging backward, the elastic chest springs out to its original size and the air is drawn into the lungs. The movement is at the rate of 12 to 14 a minute. Better time with a watch.

The Sylvester Method.—Put on the back. The tongue must be held out as otherwise it will fall back and block the windpipe. Grasp it in a dry cloth or pinchers. Have some one hold it out or better hold it out by a bandage or rubber band over the tongue and under the jaw. Put a rolled up coat, a small log or something else of the same shape and size under the suffocated man's shoulders. This will straighten his windpipe. Kneel just above patient's head, catch both his arms just below the elbows. Draw the arms outward and upward gently and steadily and hold them as far as they will go above head for about two seconds. This motion opens and expands the chest to the greatest possible extent. This is due to the fact that certain muscles are attached to both arms and ribs and when the arms are raised these muscles raise the ribs and so enlarge the chest. Then bring the arms down till the elbows press against the chest; a little pressure will diminish the size of the elastic chest as much as possible. Do this for about two seconds. Continue these motions about fifteen times per minute. This when done properly is hard work for the operator and he should be relieved by some one else as soon as he grows tired.

Whatever the method of artificial respiration used it should be kept up for at least an hour and a half.

The further treatment is as follows:

Ammonia, on a sponge or handkerchief put under, but not on, the patient's nose will help to revive him.

At the same time that one or two persons are performing artificial respiration, without interfering with them, others should cover the patient with a dry coat or blankets.

As soon as the patient begins to breathe himself, but not before, his limbs should be well rubbed toward the heart under the blankets. This will help to restore the circulation.

When the patient is partially restored he may have a chill and vomit. If he vomits while on his back he must be turned on his side so that the vomited matter will not enter the windpipe.

He should afterward be put to bed well covered and surrounded with hot bottles. The windows should be opened so that he may have plenty of air.

After the danger is over the patient should be allowed to sleep quietly.

He will feel very nervous and shaken for a time and should be given absolute rest till he recovers from this condition. No food except hot beef tea should be given for several hours. Hot coffee, however, is useful as soon as the patient can swallow and retain it.

A doctor is always required for suffocation.

While the pulmotor is now often used to advantage in place of artificial respiration, you must never wait for it.

Warning.—If the breathing stops at any time after it has once begun you must immediately start again with artificial respiration. Piece in rather than do it all. Let the patient breathe himself as he can. You are to make the necessary movements when he cannot. Maintain same rate.

The commoner causes of suffocation will now be discussed in more detail. Of course the important treatment for all of them is artificial respiration.

Drowning

Prevention.—This will be spoken of under two heads: 1. Prevention of accidents that may result in drowning. 2. Rescue of drowning persons.

1. **Prevention of Accidents that may Result in Drowning.**—Boating accidents are frequent in all parts of the country during the summer season. In order to do your part to prevent them—*Remember*: A light boat is not intended for heavy seas; do not

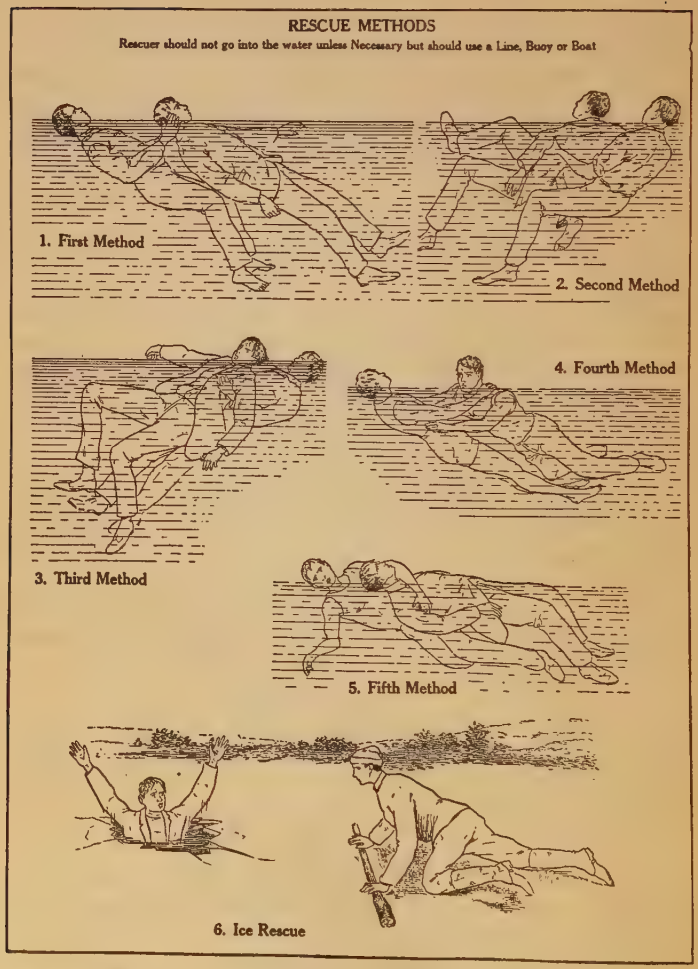

RESCUE METHODS
Rescuer should not go into the water unless Necessary but should use a Line, Buoy or Boat
1. First Method
2. Second Method
3. Third Method
4. Fourth Method
5. Fifth Method
6. Ice Rescue

PLATE XIV.—Drowning.

change seats except in a wide and steady boat, and above all things do not put yourself in the class of idiots who rock the boat. In case you are thrown into deep water by the turning over of a boat, or from any cause, do not lose your presence of mind even if you cannot swim. Remember that the water will almost support your weight. Allow yourself to sink low so your nose is just above the water and support yourself by a hand on the boat. Even an oar under the chin will hold you up. If there is nothing which will help to support you, lie flat on the back with the arms stretched out. Especially in salt water with light clothing, one may float almost indefinitely in this position. To do so it is necessary to keep cool if the water or spray rises over the face momentarily. Throwing up the head, or still worse the arms or legs to prevent this will result in sinking.

At the seashore, unless you are a strong swimmer, do not go outside the life-lines and if the undertow is strong be careful that you do not walk out so far that you may be carried off your feet.

The art of swimming should be made a part of the education of every boy and girl. It is not enough to know how to swim a few strokes. One should at least be able to swim for a few moments while dressed.

Very cold water and very long swims are likely to result in the exhaustion of even a strong swimmer and are therefore hazardous unless a boat accompanies the swimmer.

2. **Rescue of Drowning Persons.**—If possible, do not attempt to rescue a drowning person in deep water by entering the water yourself. The best interests of the drowning person are served, when practical, by holding out or throwing something into the water on which he can support himself till he can be pulled ashore or reached in a boat. In case a person has fallen into deep water near the shore take an oar, a pole, a rope or even your coat and hold it out so the drowning person may grasp it. Life preservers, boxes, boards or logs may also be thrown into the water close to the person drowning. As has been stated above, a small, floating object is quite sufficient to sustain a person's weight in the water.

If the person in danger of drowning is so far from the shore

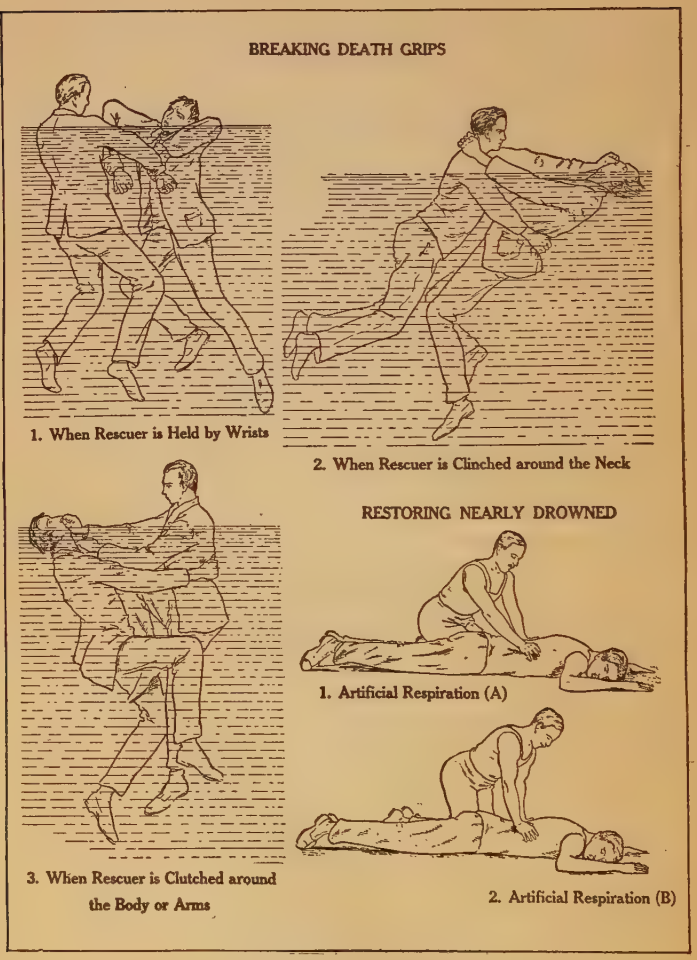

BREAKING DEATH GRIPS
1. When Rescuer is Held by Wrists
2. When Rescuer is Clinched around the Neck
3. When Rescuer is Clutched around the Body or Arms
RESTORING NEARLY DROWNED
1. Artificial Respiration (A)
2. Artificial Respiration (B)

PLATE XV.—Drowning.

that the methods just spoken of cannot be used you must enter the water to rescue him. Take off as much of your clothing as possible. It is especially necessary to rid yourself of your shoes. If you are not a strong swimmer it will be much better to support yourself with a life preserver, a board, box, or the like, when swimming out to the drowning person.

Always take care not to allow a drowning person to grasp you for this will very likely result in the loss of both your lives. If he succeeds in seizing you it will be safest to allow yourself to sink or to strike him a blow in the face in order to make him loosen his hold. There is no cruelty in such a blow; it may be his only salvation. Unconscious persons are in fact rescued much more easily.

The methods of breaking death grips are illustrated and should be adopted in proper cases.

Always approach a drowning man from behind. A practical method of rescue is to grasp his hair or collar with your left hand and his right shoulder with your right hand keeping him at arm's length with his mouth and nose just above the water, then "tread water." As soon as you can, seize his right wrist and pull it behind his head, then take a few strokes to get on your back, at the same time pull the person you are rescuing on your chest and start to swim backward to shore. Swim as low as possible, with your face and that of the drowning person just out of the water.

To rescue a person who has broken through the ice: You should first tie a rope around your body and have the other end tied, or held, on shore. Then secure a long board, or a ladder, crawl out on this or push it out so that the person in the water may reach it. If nothing can be found on which you can support your weight do not attempt to walk out toward the person to be rescued, but lie down flat on your face and crawl out as by doing this much less weight bears at any one point on the ice than in walking.

Symptoms.—Are of course those of suffocation. In addition a frothy fluid is often noticed in the mouth and nose and the body is cold.

Treatment.—Artificial respiration and other measures just as described under Artificial Respiration. If there is mud or water in the mouth, first clean it out by a handkerchief wrapped around the first finger. If the Schaefer Method is used, you may proceed with artificial respiration at once. If the Sylvester is employed, before giving it, it will be well after cleaning what mud and water you can from the mouth to turn the patient on his face, clasp hands around his waist, raise him by the middle and hold up for a few seconds in order that water may drain from throat and lungs. Don't waste time before beginning artificial respiration.

Electric Shock

The more general use of electricity is making accidents due to it more common year by year. Even now the third rail and the live wire are responsible for many injuries and deaths.

The ordinary trolley wire carries a current of about 500 volts, and incandescent and arc-light currents run from 2500 to 3000 volts. The passage of these powerful currents through the body causes dangerous shock or even death.

Prevention.—The third rail is always dangerous, so avoid it.

Swinging wires of any kind may somewhere in their course be in contact with live wires, so they should not be touched.

Electric wires must always be carefully avoided.

Symptoms.—Are due to paralysis of the nerve center in the brain which governs breathing and in consequence are those of suffocation.

Sudden loss of consciousness occurs when a powerful electric current passes through the body.

The breathing may be entirely stopped or it may be shallow and only occasional.

Weak pulse as the electric current affects the heart as well as the breathing apparatus.

If hands are in contact with a live wire, may not be able to release them at first

Burns of hands or other parts of the body in contact.

The direct current causes severe burns but is not so dangerous to life. The alternating while more dangerous to life does not cause as severe burns. Low-voltage currents, especially alternating currents, cause many deaths.

Little difficulty should be experienced in making out cause of injury.

Treatment.—First, rescue; second, treat.

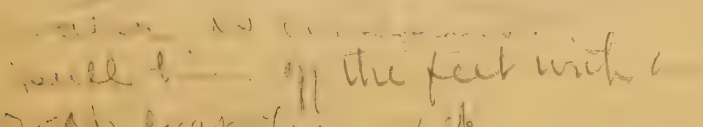
1. **Rescue.**—In some cases it will be possible to shut off current and this should always be done if it can be done quickly.

A person in contact with wire or rail carrying an electric current will transfer current to rescuer if the latter puts himself in the line of passage of current. Therefore, he must not touch the body of a person touching a live wire or a third rail unless his own body is thoroughly insulated. Naturally too, he must not himself, in attempting to aid the injured person, bring any part of his own body in contact with the live wire or other apparatus carrying the electric current. Moreover, he must act very promptly for the danger to the patient is much increased the longer the electric current is permitted to pass through his body. If possible, the rescuer should insulate himself by covering his hands with a rubber coat, rubber sheeting, or even several thicknesses of dry cloth. Silk is a good non-conductor. In addition he should, if possible, complete his insulation by standing on a dry board or a thick piece of dry paper, or even on a dry coat. Rubber gloves and shoes or boots are still safer, but they cannot usually be procured quickly. If a live wire is under a patient and the ground is dry it will be perfectly safe to stand upon it and to pull him off the wire with the bare hands. But they should touch only his clothing and this must not be wet.

A live wire lying on a patient may with safety be flipped off with a dry board or stick.

In removing the live wire from the patient, or the patient from the wire, do this with one motion as rocking him to and fro on the wire will increase shock and burn.

A live wire may be safely cut by an axe or hatchet with a dry wooden handle and the electric current may be short-circuited



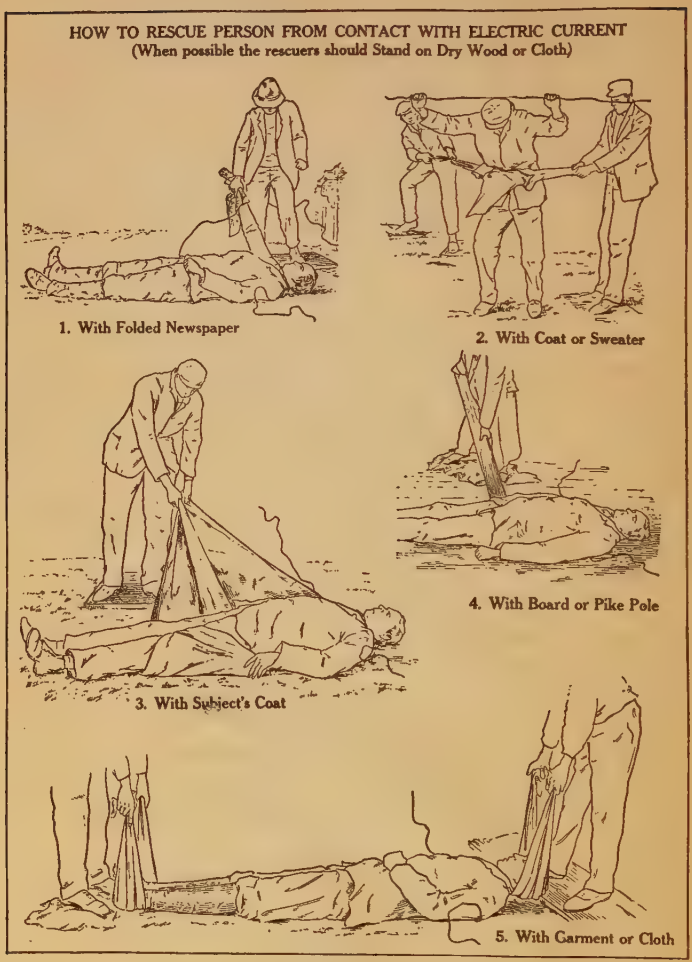

HOW TO RESCUE PERSON FROM CONTACT WITH ELECTRIC CURRENT
(When possible the rescuers should Stand on Dry Wood or Cloth)
1. With Folded Newspaper
2. With Coat or Sweater
3. With Subject's Coat
4. With Board or Pike Pole
5. With Garment or Cloth

PLATE XVI.—Electric shock.

by dropping a crowbar or poker on the wire. These should be dropped on the side from which the current is coming and not on the further side as the latter will not short-circuit the current before it has passed through the patient's body. Drop the metal bar, do not place it on the wire or you will then be made a part of the short circuit and receive the current of electricity through your body.

2. **How to Treat.**—Some cases of electric shock from powerful currents are hopeless from the beginning. It is impossible to tell this at first, however, and, therefore, an attempt should always be made to save the life of patient by prompt treatment. The treatment is artificial respiration.

It is possible for those who have received an electric shock which does not render them unconscious to perform artificial respiration of a sort on themselves and so to recover without further treatment. This is done by raising the upper extremities and lowering them again and again while taking deep breaths.

Burns from electricity should be treated like other burns.

Gas Poisoning

Illuminating gas is so generally employed that this form of suffocation is common. Very similar effects are produced by other poisonous gases.

Causes.—The common gases which produce suffocation are illuminating gas, coal gas from furnaces or stoves and smoke often mixed with different gases. Poisoning from ammonia fumes is seen now much more frequently than formerly, as at present ammonia is so largely used in refrigerating and ice-making machinery.

Prevention.—Naturally is dependent on the cause. Extraordinary care must be taken wherever much gas is mixed with the air.

Leaks in gas pipes should be promptly repaired. Be careful in turning off gas to make sure that gas is actually shut off.

It is dangerous to leave a gas jet burning faintly when you go to sleep, as it may go out if pressure in gas main becomes less,

RESCUE METHODS (Continued)

1. With Wooden Handled Tool

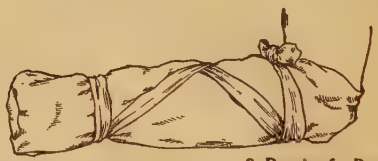
HOW TO GIVE ARTIFICIAL RESPIRATION

1. Artificial Respiration (A)

2. Artificial Respiration (B)

BURNS

1. Showing Different Degrees from Charring to Reddening of Skin



2. Dressing for Burn of Forearm

PLATE XVII.—Electric Shock.

and if pressure is afterward increased, gas may escape into room in large amount.

Coal gas will escape through red-hot cast iron, and very big fires in such stoves are dangerous, especially in sleeping rooms.

Charcoal burned in open vessels in tight rooms is especially dangerous.

In sewers and wells it is customary to lower a lighted candle or torch; if this does not burn it is certain the air is so impure that one cannot live in it.

Symptoms.—Are those of Suffocation but in those slightly affected are not so severe: Headache, dizziness, sick at stomach and vomiting, very sleepy, weak, rapid breathing, fast pulse.

Treatment.—Rescue person overcome promptly and take him where there is plenty of good air. To rescue an unconscious person in a place filled with gas, move quickly and carry him out without breathing yourself. Take a few deep breaths before entering and if possible hold breath while in the place. Frequently less gas will be found near floor. So, one may be able to crawl where it would be dangerous to walk. The treatment is artificial respiration.

In those slightly affected, artificial respiration is unnecessary. Aromatic spirits of ammonia, one-half teaspoonful in half glass of water. Repeat if necessary four times at 15-minute intervals. Smelling salts to nose. Baking soda, a teaspoonful in one-half a glass of water will settle the stomach and cause belching of gas. In gas works, effervescing phosphate of soda is often provided and is perhaps the best remedy instead of baking soda though if it is not at hand it would be a bad mistake to wait to procure it instead of using baking soda. The dose of phosphate of soda is two teaspoonfuls in one-half glass of water. In gas works too, weiss beer or plain soda water are sometimes used instead of phosphate of soda. The value of breathing in vinegar from a sponge and of the current of air from an electric fan is also generally recognized.

If a person with gas poisoning in this stage is fairly strong he should be walked around, two persons supporting him with his arms around their necks. If feet drag this shows he is too weak

for this treatment and he should be placed lying down. Then if he is not breathing well, start artificial respiration.

Even in mild cases it is much safer to send for a doctor.

Hanging

Hanging is a common means of suicide. As the rope cuts off the air to and from the lungs the result is, of course, suffocation.

Treatment.—Cut down and remove the rope from the neck. Artificial respiration.

QUESTIONS

1. What is the cause of suffocation?
2. Of what does the respiratory system consist?
3. How may the supply of air to the lungs be interfered with?
4. Symptoms of suffocation?
5. What is Artificial Respiration?
6. What should you do for a suffocated person besides performing the movements of artificial respiration?
7. Drowning. Prevention? Rescue? Treatment?
8. How weak a current will cause dangerous electric shock?
9. Electric shock; prevention; symptoms?
10. What would you do to rescue a person in contact with a live wire?
11. How would you treat him after he had been rescued?
12. How would you treat a burn due to electricity?
13. Gas Poisoning. Prevention? Treatment?
14. What would you do for a person who had attempted suicide by hanging?

PRACTICAL EXERCISES

Each member of the class should be required to give artificial respiration by the Schaefer and Sylvester Methods.

CHAPTER VIII

UNCONSCIOUSNESS OR INSENSIBILITY. POISONING

UNCONSCIOUSNESS

Unconsciousness, is lack of consciousness. One who is unconscious knows nothing of his surroundings, or of what is happening. There are, however, different degrees in this condition. That is to say, the same causes when not exerted to so great an extent may only cause partial unconsciousness, which may be recovered from without going further, or may be followed by total unconsciousness. Insensibility and unconsciousness are two different names for the same thing. Perhaps no condition which the first-aid student may be called upon to treat may prove more puzzling than this. Unconsciousness may result from a number of different causes, and in order to give the best treatment one should determine first what the cause is. Always make an earnest effort to do this by taking the surroundings into account as well as by examination of the patient.

Suppose, however, that you are unable to determine the cause of unconsciousness. At least make very sure that it is due neither to a poison, to bleeding nor to sunstroke, for each of these demands immediate special treatment, or to suffocation for which you would, of course, give artificial respiration. Then, unless it is necessary to give the special treatment, if the patient is pale and weak have him lie down with his head low and warm and stimulate him in every possible way; on the contrary, if the face is red and pulse is very strong, while the position for the patient should also be lying down, the head should be raised. No stimulants should be given in the latter condition and cold water should be sprinkled on face and chest.

A doctor is always needed.

The common causes of unconsciousness are: Bleeding, shock, electric shock, sunstroke, heat exhaustion, freezing, fainting, fits, apoplexy and injury to the brain, and certain poisons.

The six causes which head this list have already been discussed at length and are only mentioned here so that the first-aid student may find in one place all the commonest causes of unconsciousness. Likewise and for the same practical reason, poisoning by alcohol, opium and its preparations, and carbolic acid are discussed here.

1. **Bleeding.**—Ordinarily you will see the blood in a wound. Even in internal bleeding from the lungs or stomach, blood is often coughed up or vomited as the case may be.

2. **Shock.**—You learn an injury has been received, or there is other evidence of injury.

3. **Electric Shock.**—Should be no difficulty in finding out the cause.

4 and 5. **Sunstroke and Heat Exhaustion.**—In very hot weather. In sunstroke the patient is so hot that his skin seems to be burning. With heat exhaustion, the skin is cold and clammy like in a faint which it resembles closely.

6. **Freezing.**—Should experience no difficulty.

7. Fainting

Cause.—A lack of blood to the brain. Some persons often faint. Fainting is common in any form of weakness, as when recovering from a severe illness. Some people faint at the sight of blood.

Prevention.—A person who has not yet recovered his full strength after an illness or injury should be careful not to overdo physically. Persons who faint from trivial causes require the advice and treatment of a physician. Remember that fainting may be due to a hemorrhage, and if there is any reason to suspect that the patient is bleeding, examine him carefully and check the bleeding promptly.

Symptoms.—Usually occurs in overheated, crowded places.

Patient becomes paler and paler and finally sinks to the floor unconscious. Unconsciousness is partial or complete. Face is pale, frequently covered with cold perspiration. Pupils are natural. Breathing is shallow and sighing. Pulse is weak and rapid. No other cause for unconsciousness.

Treatment.—Sometimes can prevent fainting by having person who feels faint double over so that head is between knees. If this does not prove effective at once do not continue. Air, especially cold air, and cold water often prevent actual fainting when a person feels faint. If patient has actually fainted, put him in lying-down position with his head lower than the rest of his body, so that brain will receive more blood. Loosen clothing, especially around neck, for same purpose. Open windows, if necessary, and keep away crowd so that patient may get plenty of air. Sprinkle face and chest with cold water. Smelling salts or ammonia to nose. Rub limbs toward body. Do not allow patient to get up until fully recovered. May give stimulant when patient has so far recovered that he is able to swallow.

8. Fits

These, which usually occur in young adults, begin generally by the afflicted person falling to the ground, perhaps with a cry, and then going through all sorts of convulsive movements, throwing the arms and legs about, jerking the head, rolling the eyes, and foaming at the mouth, and perhaps biting the tongue. There should be little difficulty in telling what is the matter at this stage, but afterward, unconsciousness comes on.

If you can see or find out about the convulsion you will at once know what the trouble is. In the unconscious stage this is not so easy. Disarranged clothing, foam at the mouth, and the bitten tongue should be looked for.

In the unconscious stage, it is only necessary to allow the patient to rest quietly. Do not try to prevent the convulsions by holding him. Put him on the ground, or floor, or somewhere else where he cannot injure himself by threshing about and put

a piece of wood covered with a handkerchief in his mouth so that he cannot bite his tongue.

9. Apoplexy and Injury to the Brain

Apoplexy is due to the bursting of a diseased blood-vessel in the brain. The escaping blood presses on the nerve-centers and this causes the symptoms. An injury of the brain also injures these centers, so from a first-aid standpoint the symptoms and treatment of apoplexy and brain injuries may be considered together.

Symptoms.—Apoplexy often comes on suddenly. In brain injury, may see and learn of injury to head. In brain injury there may be hemorrhages from nose, ears, mouth and eyes. Unconsciousness, complete. Face: Red in apoplexy; pale in injury. Pupils, large and frequently unequal in size. Eyeballs insensitive to touch. Breathing, snoring. Pulse: full and unusually slow. Paralysis usually on one side of body. Test by raising arm or leg. If paralyzed, will drop absolutely helpless.

Treatment.—Send for doctor at once. Rest and quiet, in a dark room if possible. In lying-down position with head and shoulders raised on a pillow. Ice or cold cloths to head. Hot bottles to limbs. No stimulants.

10. Alcoholic Poisoning

Alcoholic poisoning or intoxication represents the final stage in acute drunkenness; that is, the common spere.

Symptoms.—Perhaps evidence of intoxication. Unconsciousness, partial or complete; frequently able to arouse patient to some extent. Face sometimes flushed and bloated, or may be pale. Skin cool and may be moist. Pupils natural or large. Eyeballs red, but not insensitive to touch. Breathing about as usual when in deep sleep. Pulse, usually rapid and weak, but may be slow. May be strong odor of liquor. No paralysis.

Warning.—Insensibility from alcohol and apoplexy are more often mistaken one for the other than are any other forms of unconsciousness. The most important symptoms in which

they differ are the state of the pupils, the sensitiveness of the eyeballs and paralysis. The odor of liquor on the breath is of little value, because a person with apoplexy may have been drinking.

Treatment.—If any doubt whether drunkenness or apoplexy, always treat for apoplexy and be particularly careful not to make patient vomit, as this will cause more bleeding into brain.

In drunkenness, if able to arouse sufficiently, give emetic—mustard and water or luke-warm water are usually easily procured. Afterwards strong coffee or aromatic spirits of ammonia. Hot bottles around patient. Rub limbs toward body to increase circulation.

11. Poisoning by Opium or some Preparation of Opium, usually Morphine

Cause.—These poisons are often taken in attempts at suicide but a good many soothing syrups and quieting mixtures contain opium or one of its numerous preparations and as children are very susceptible to these drugs cases of poisoning due to them are not uncommon.

Prevention.—As with all poisons, no opium mixture should be allowed to fall into the hands of anyone who will not know what it is and its dangers. Soothing syrups should never be given to children. All drugs containing opium are dangerous unless prescribed by a doctor.

Symptoms.—May find person has taken opium or may find bottle which contained poison. Unconsciousness which comes on gradually and finally becomes complete. Face red at first, finally dark purple. Lips bluish. Pupils very small, like pin heads. Breathing full and slow at first, gradually slower and shallow. Pulse, slow and full, afterwards weak. Possibly smell of laudanum on breath. Symptoms that should be especially noted are pin-head pupils, breathing and that patient is first very sleepy and then becomes unconscious.

Treatment.—Give an emetic: mustard and water; salt and water; luke-warm water alone in large quantities. Exact dose is unimportant, give in large quantities and repeat if pro-

fuse vomiting does not occur. (May have difficulty in getting emetic to work.) Plenty of strong coffee. Try to arouse patient by speaking loudly and threatening him, also slap with wet towel. Walk up and down, two persons supporting him. Must stop this if patient is weak or you will exhaust him. Then put on back. Artificial respiration will then be required more than anything else. Stimulants.

12. Carbolic-acid Poisoning

Cause.—This poison is easily obtained and is often used in attempts at suicide. On account of its strong odor it is rarely taken accidentally.

Prevention.—Like that of other poisons. As it produces bad burns it should never be applied to the skin.

Symptoms.—You may find poison has been taken or the bottle which contained poison. Vomiting and great pain. Skin covered with cold sweat. If severe case, unconsciousness, usually followed promptly by death. Strong carbolic acid is a very rapid poison. May almost always know by the strong smell of carbolic acid. Lips, tongue and mouth are burned white by pure, and black by impure carbolic acid.

Treatment.—Rinse mouth with pure alcohol. If grown person, should swallow three or four tablespoonfuls of alcohol mixed with an equal quantity of water. (Use other remedies for children.) Follow this in five minutes with two tablespoonfuls of Epsom salts dissolved in a little water. Though not so good, lime-water may be used to rinse mouth, several glasses of it being also swallowed. Three or four raw eggs may be given, or castor or sweet oil. Stimulants always, and keep warm.

In burns of the skin from carbolic acid, use alcohol to neutralize the acid. Afterwards treat like other burns.

POISONING

Alcohol, opium, and its preparations, and carbolic acid have already been discussed.

Any substance taken into the body which will cause death is a poison. But only poisons which are swallowed will be considered here.

Prevention.—Accidental poisoning may be prevented to a very great extent by never taking any medicine which is not properly labeled, and by putting poisons, when they must be kept on hand, in a safe place under lock and key.

Symptoms and Evidence of Poisoning.—The symptoms vary with the special poison. But there is certain evidence which indicates, in the majority of cases, that a poison has been taken. Sudden, severe and unexpected illness in any one after eating, drinking or taking medicine may be due to poison.

Possibly the poisoned person has been melancholy and has talked of suicide. Bottles, glasses or the like in which some of the poison remains may be nearby.

Frequently a person who has taken poison intentionally, becomes frightened and is only too glad to tell some one that he has poisoned himself and what poison he has used. In accidental poisoning the patient is, of course, willing to tell all he knows in reference to the poison.

If a number of persons who have eaten the same food become seriously ill after a meal, it is almost certain they are suffering from poison, probably decayed food or the so-called ptomaine poisoning.

Treatment.—Delay is likely to prove fatal in poisoning so whatever is done must be done promptly. Always send for a doctor at once but do not wait for his arrival. An emetic is not the best treatment for every poison. But, nevertheless, it should always be given if you do not know what poison has been taken and the proper antidote.

Running the finger down the throat or drinking a large quantity of warm water will usually cause vomiting.

Good emetics are:

Mustard and water or salt and water, a teaspoonful of either in a glass of luke-warm water. One or two teaspoonfuls of the wine or syrup of ipecac are also good and usually easily procured. Do not waste time in getting the exact dose, however,

and repeat if profuse vomiting does not result. Drink luke-warm water between attacks of vomiting.

The following table, giving the antidotes for special poisons may be consulted with benefit if it is at hand. No attempt should ordinarily be made by the first-aid student to learn it by heart.

Poisons are of Three Kinds

(A) **Corrosive poisons** produce instant burning effect on all parts touched by them so there is staining of lips and mouth and burning pain in mouth, throat and stomach; straining and vomiting; also perhaps suffocation and always shock.

(B) **Irritant Poisons.**—Such poisons irritate but do not corrode parts they touch. No staining; metallic taste; burning of mouth and throat and in stomach, straining, vomiting and purging. Shock.

(C) **Nerve poisons** do not stain. Two classes:

1. Narcotics. Produce deep sleep and insensibility.

2. Convulsants. Produce convulsions, twitching, delirium and suffocation. (Some poisons are both irritant and nerve poisons.)

(A) **Corrosive Poisons.**—Those which stain and for which an emetic is best not given. Strong acids: Sulphuric (oil of vitriol); hydrochloric (spirits of salt); nitric (aqua fortis). Strong alkalies: Caustic soda, potash and lime.

Treatment.—

1. Neutralize poison.
2. Dilute poison and soothe corroded parts.
3. Stimulants.

(1) If acid, to neutralize give alkalies as plaster from ceiling, magnesia, baking soda or even soap. If alkalies, to neutralize give vinegar, lemon or orange juice.

(2) To dilute and soothe for both acids and alkalies give large quantities of oil, any vegetable or animal oil, such as olive, salad, sardine, linseed, castor or cod liver oil; also water, milk, flour and water, or eggs beaten up.

(3) Stimulants: Strong tea and coffee, ammonia or alcohol.

(B) **Irritant Poisons.**—Those which do *not* stain and for which an emetic is given. Tartar emetic, blue stone, Paris Green, lead, corrosive sublimate (antiseptic tablets) phosphorus and arsenic (rat poison and other vermin killers); poisonous plants.

Treatment.—

1. Emetic.
2. Dilute poison and soothe parts.
3. Stimulants.

2. To dilute and soothe: As in corrosive poisons. *But* no oil in phosphorus poisoning.

3. Stimulants: As above.

(C) **Nerve Poisons.**—Do not stain and require an emetic.

(1) Sleep producers: Opium, morphine, laudanum, paregoric, soothing syrups, powders, chlorodyne. At first very sleepy, later insensibility, pupils of eye very small, breathing deep, slow and snoring, face first flushed then livid, breath may smell of the poison.

Treatment.—

1. Emetic.

2. Keep awake, strong coffee. Slap with wet towel. Walk up and down supporting on each side. Stop this if weak and put in lying-down position.

3. Artificial respiration.

(2) Convulsants. Strychnine, belladonna, prussic acid, etc. Strychnine is far more common. Is found in some vermin killers.

Treatment.—In all these poisons must work very quickly. Emetic. Do not wait for it to be prepared but tickle back of throat with finger and keep it there till vomiting occurs. Artificial respiration if breathing stops.

QUESTIONS

1. What is unconsciousness?
2. To what causes is it most commonly due?
3. Explain how you would make out the cause?

4. If you were unable to do this what would you do?

5. Fainting; cause; prevention; symptoms and treatment?

6. Symptoms and treatment of fits?

7. Alcoholic poisoning, with what is it often confused and what should you do to prevent such a mistake?

8. Treatment of alcoholic poisoning.

9. Apoplexy and injury to the brain, symptoms and treatment?

10. Symptoms and treatment of opium poisoning.

11. Symptoms and treatment of carbolic-acid poisoning.

12. What would make you think a person had been poisoned?

13. What different classes of poisons are there and the treatment of each class?

14. What would you do if you thought a poison had been taken but could not find out what the poison was?

PRACTICAL EXERCISES

A general review which should include practical problems in first aid of general interest and of interest to the special class. As an example of a problem of the former kind the following is given: You are walking along a country road and find a man who has been thrown from his horse. He is unconscious, his right thigh and left arm are broken. Take care of him.

Questions should always be asked in connection with the problems so that the instructor may make sure the members of the class clearly understand what they are doing and the reason for each step.

CHAPTER IX

COMMON EMERGENCIES

1. Cramp or Colic. 2. Diarrhea. 3. Constipation. 4. Nausea and Vomiting. 5. Hiccough. 6. Chill from Exposure. 7. Nervous Attacks. 8. Croup. 9. Neuralgia of Face. 10. Tooth-ache. 11. Ear-ache. 12. Styes. 13. Sunburn. 14. Prickly Heat. 15. Poison Ivy or Oak. 16. Mosquito Bites. 17. Chilblains. 18. Corns. 19. Poisonous Plants, especially Mushrooms. 20. Home Medicines.

Care of cases of slight illness usually falls on the women of the family. For them, therefore, it is no less necessary to know how to meet these common household emergencies, as they are sometimes called, than it is to know how to take care of injuries. In fact, it often proves to be much more important.

A word of warning must be said here, however. One may be of the very greatest service if she learns how to prevent and to treat these minor illnesses. On the other hand, if this knowledge results in her dosing her family with drugs great harm is sure to follow. This is a responsibility she has no right to take. Every one employs a lawyer to look after questions of property. Health questions are certainly of more vital interest, and to settle them a trained man is no less necessary and in this case this is the doctor.

Our country has suffered more from amateur doctoring especially with patent medicines than any other. The dangers of such medicines should be clearly understood. They are made up for the million and they cannot fit any one person any more than one dress would fit a million women. An ill-fitting dress may do no harm except to one's pride but the delicate cells which

make up the human body cannot be insulted in this way without serious consequences. It is true some manufacturers of patent medicines claim to fit their medicine to each case but so far as my observation goes this is never done, cheap clerks with no knowledge of medicine actually deciding what is required. Even supposing this were not the case, such treatment would depend on the statements of the person seeking it and no reputable doctor pretends to be able to tell what is the matter unless he is given the opportunity to see, question and, if necessary, examine the patient. Patent medicines, too, are made up for profit, the expenses connected with selling them are very great so you can never get the value of the money you spend on them. Moreover, many of these preparations contain dangerous drugs through which in perfect innocence, the whisky, morphine or cocaine habits may be acquired. Still further while patent medicines may give a temporary feeling of relief, often through the alcohol which they contain, one taking them may be really growing worse all the time so that finally when a doctor is consulted it is too late for him to do anything.

The best advice which can be given, therefore, is to confine yourself to the simple remedies mentioned here and to caring only for real emergencies, calling a doctor promptly if necessary. This will result in saving health, money and time.

1. Cramp or Colic

As everyone knows, abdominal cramp is a severe pain in the abdomen which comes, lets up, and comes again. The cramps may follow one another very rapidly or there may be some time between them.

Cause.—Common cramp is due to a spasm of the intestines caused by indigestible food, or by cold, especially when overheated in hot weather. More uncommon causes are appendicitis and gall or kidney stones.

Prevention.—As one of the commonest causes of cramp is indigestible food you should be careful to avoid this; unripe fruit and partially spoiled food are most dangerous. Even in very

hot weather the abdomen should be lightly covered, especially at night, and if one is subject to cramps they will often be prevented by the use of an abdominal band.

Prevention of cramp due to the other causes which have been mentioned is too complicated a subject for discussion except in medical books.

Symptoms.—Severe cramping pain in the abdomen and shock in severe cases. If shock is severe, it is well to conclude that something more serious than intestinal cramp is present.

Treatment.—A hot bottle placed on the abdomen or rubbing it will often give relief. Soda mint tablets, or even better, hot water with a little syrup of ginger should be taken. Indigestible matter may be gotten rid of by vomiting or by a cathartic, such as a compound cathartic pill, salts, or a Seidlitz powder. If shock is severe always send for a doctor.

2. Diarrhea

Is caused just as is the common type of abdominal cramp and naturally its prevention is the same.

Treatment.—The object of treatment is to expel the indigestible matter from the bowels. This is best accomplished by giving $\frac{1}{10}$-grain doses of calomel, 15 minutes apart until 6 doses are taken, and by following this after 8 or 10 hours by a Seidlitz powder or a dose of Epsom Salts.

For diarrhea with considerable cramping pain a teaspoonful of syrup of ginger in $\frac{1}{3}$ of a glass of water should be given after each passage. For painless diarrhea, 20 grains of subnitrate of bismuth, 3 times daily, is a good and safe remedy. For children a dose of castor oil should be given instead of the remedies which have been mentioned.

The diet is also of great importance in diarrhea and nothing should be eaten which will furnish new food for fermentation or will irritate the digestive organs.

Milk in small quantities is the best food for both grown-ups and children. Boiling the milk is the wiser plan unless it is certain that it is very fresh and pure.

If the remedies mentioned do not cure the diarrhea it is much safer to consult a doctor. There are any number of so-called cholera cures on the market but the majority contain opium in some form and are therefore dangerous, especially for children.

3. Constipation

Constipation may be prevented in most people. Persons inclined to be constipated should be careful to eat bulky food; oatmeal and the like are especially good as they irritate the intestines slightly. They should also drink plenty of water. Many persons too suffer from chronic constipation because they are careless and do not establish regular habits. Instead of always taking cathartics one who suffers from chronic constipation should try to get rid of the cause of this condition. To do this the advice of a doctor is required.

For acute constipation, six $\frac{1}{10}$-grain doses of calomel at intervals of 15 minutes, taken at night, and a Seidlitz Powder or a dose of Epsom Salts the next morning are excellent remedies.

4. Nausea and Vomiting

These are also usually due to indigestible food but may be caused by dyspepsia or nervousness.

Treatment.—When due to indigestible food, several large drinks of luke-warm water will usually cause free vomiting and will wash out the stomach, which is very desirable. The further treatment is the same whatever the cause. Patient should lie down in cool place. Hot applications to abdomen; cloths wrung out in hot water or a mustard plaster. A soda mint tablet or a little baking soda will usually stop both nausea and vomiting and in other cases sucking small lumps of ice will be found efficacious.

5. Hiccough

Is usually due to overeating and indigestion. It is caused by a spasmodic contraction of the diaphragm, the great muscle

which separates the chest from the abdomen. This is the reason that holding the breath as long as possible will usually cure it as the air in the chest forces the diaphragm down so it cannot contract. Drinking a large glass of water in small sips without taking a breath has exactly the same effect. The reason that a scare stops hiccough sometimes is because this causes the patient to take a long breath. If none of these methods is successful, vomiting by removing the irritating material from the stomach will almost always cure the hiccough.

6. Chill from Exposure

When one is exposed to the cold, especially to cold rain or snow, or falls into cold water he will often become what is commonly called "chilled through."

Cause.—This condition is due to the fact that the cold contracts the blood-vessels of the skin, driving the blood to the interior of the body. This gives one the sensation of chilliness.

Symptoms.—You are chilly. The lips become blue and the teeth chatter.

Treatment.—Remove the clothing, if possible, and put into a warm bed, covering the patient warmly. Two or three hot bottles will warm the bed well. Rubbing his limbs and body will also bring the blood to the surface and so help to cure the chill. Hot drinks should also be given. Hot tea, hot coffee, hot milk, and hot lemonade, are all good.

7. Nervous Attacks

These are usually a mild form of hysteria. The patient has a fit of shivering and complains of feeling cold and upset. The treatment is exactly the same as that described for a chill from exposure.

8. Croup

This is a children's disease due to a spasm of the muscles of the upper air-passages. Children often have what is called a croupy

cough whenever they catch cold. This is a hard ringing cough which is distressing but not particularly alarming except to parents, who fear, perhaps from previous experience, that an attack of true croup is coming on. Lighting the light, talking to the child, reading to him, or telling a favorite story will often result in the attack passing off and in the child becoming drowsy and finally going to sleep.

True croup is much more alarming though not often dangerous. The child has the ringing cough and croupy crow and becomes partially suffocated because sufficient air does not enter the lungs. The face becomes bluish and the child struggles to get its breath.

Treatment.—Send for a doctor but do not wait for him to arrive. Such a child should at once be given an emetic. A teaspoonful of syrup of ipecac is best for this purpose followed by a drink of warm water. Then cloths wrung out in as hot water as the child can stand should be put about the throat and on the chest. These should be covered with a piece of dry cloth, or, better, of oiled silk if this can be procured. Change these cloths as soon as they begin to grow cool, but do nothing further till the physician arrives.

cold compresses to throat. croup epis

9. Neuralgia of the Face

Some people are very subject to neuralgia or pain in some of the nerves of the face. This neuralgia may be due to the irritation of a bad tooth or to some other irritation less easily found, but unfortunately in certain people the cause cannot be discovered. Persons who suffer from attacks of neuralgia should always consult a doctor, but such attacks often come on suddenly when no physician can be obtained.

Treatment.—Hot applications are usually better than cold ones and should always be tried first unless the patient knows from previous experience that cold will do him more good. Either hot water, or cloths wrung out in hot or cold water may be used. Painting the painful part with the ordinary menthol stick relieves many people. Some are benefited by the irritation

Neuralgia pain in impaired tear

produced by rubbing, and pressure on the painful nerve often gives temporary relief. If the neuralgia is due to a bad tooth the proper emergency treatment of the tooth will frequently cure the neuralgia.

10. Tooth-ache

The prevention of decay of the teeth consists in the removal of all food from between them, for such food ferments quickly thus producing an acid which corrodes the teeth. The teeth should be brushed night and morning and after each meal if possible. Dental floss should also be used if difficulty is experienced in dislodging particles from between the teeth with a brush.

Tooth-ache is due to decay and to food entering the cavity of a tooth where it decomposes and causes irritation and pain of the sensitive nerves.

Treatment.—If the cavity can be reached, it should be cleaned out and afterwards something put in it to deaden the nerve. To clean it, twist a very small piece of cotton around a toothpick or fine knitting-needle and put it in the hole in the tooth, twisting it around and around so as to clean out the cavity thoroughly. After this has been done another small piece of cotton should be dipped in oil of cloves and then gently put into the cavity on the end of the tooth-pick or needle. If the cavity cannot be reached, the aching tooth must be treated by an application to its gum between the latter and the cheek. A small piece of absorbent cotton soaked in spirits of camphor is excellent for this purpose. The burning caused by it is severe, but it will usually cure the tooth-ache. Tooth-plasters may be used in the same way. Of course, these are merely emergency measures, and because they cure the tooth-ache for the time being, this does not mean that it is safe for you to go on without the services of a dentist. You should realize that unless you have proper attention, decay will go on in the tooth, you will have tooth-ache again, and will finally lose the tooth.

11. Ear-ache

This is particularly common in children, and may be due to bad teeth, to disease of the throat, or to trouble in the ear itself.

Treatment.—The teeth should always be examined, and if a cavity is found it should be treated in the way already described. If nothing is found the matter with the teeth or treatment of bad teeth fails to relieve the pain in the ear, it will be necessary to try to stop the pain by treating the ear itself. Cloths wrung out in hot water, changed as soon as they begin to grow cold, or a hot-water bottle put on the face covering the outside of the ear will often cure ear-ache. Another method is to heat a cloth very hot and to pour a few drops of alcohol on its center and then apply this over the ear so that the alcohol fumes will enter the ear. Alcohol on a hot shovel is even better, but harder to use. Heating sweet oil just hot enough not to burn and then putting a few drops in the ear and introducing a small plug of absorbent cotton should be tried if the other remedies mentioned do not prove effective.

Severe ear-ache always demands the services of a doctor as disease of the inner ear may result in perforation of the ear-drum, and permanent deafness, which may often be prevented by a physician if treated promptly.

12. Styes

Styes are an inflammation at the edge of the eye-lid, usually of the small glands there. As they commonly indicate ill health or an error of vision, a doctor should be consulted in order that he may give treatment which will prevent styes appearing again. The pain from a stye may be diminished to a considerable extent by wetting a cloth with water as hot as can be borne and putting it on the eye. If matter appears, a doctor should make the small cut necessary to permit it to escape.

13. Sunburn

This may vary from a slight redness of the skin to a very severe burn. People, especially those with delicate skins, may

avoid a good deal of needless discomfort by protecting themselves when exposed to the bright summer sun. That there is anything healthy in tan or sunburn is a wholly false idea. Protection is, of course, afforded by hats and clothing which shade the face and body from the sun. Wetting the face, on the contrary, especially with salt water, is likely to cause very severe sunburn. Any toilet powder will protect the face from the sun's rays to some extent.

The treatment consists of soothing applications. Cold cream and other toilet creams are good. Vaselin and carbolized vaselin are also generally used. An excellent application and one easily prepared is one part lime water to three parts almond or olive oil. These remedies should be put on immediately after washing the sunburned skin. Frequent washing will, however, make things worse instead of better.

14. Prickly Heat

Is the well-known irritating disease of the skin produced by heat. It is most common in children whose skins are very delicate and occurs in hot weather, not infrequently being due in part to too much clothing. It may be prevented to a considerable extent, even in the tropics, by not exercising so as to cause sweating and by avoiding heating drinks. A good talcum powder frequently applied also does much to prevent this annoying disease of the skin.

When prickly heat is severe the skin should be bathed with a mixture of one part alcohol to three of water, afterward dusting with talcum powder. Lime water with about two drops of carbolic acid to the ounce is an excellent application for prickly heat, as the carbolic acid numbs the nerves of the painful, irritated skin. One of these applications should always be put on after bathing.

15. Poison Ivy or Oak

These plants which so commonly cause skin poisoning belong to the sumac family. There are two varieties. One, the ivy, is a creeper or climbing plant with broad leaves, sometimes slightly

notched, arranged in clusters of three. The other, the oak, is a shrub or small tree with oval pointed leaves arranged in clusters of from seven to thirteen on a common stalk. Both have berries.

These plants cause poisoning in almost everyone who touches them and some people can hardly go near them without being poisoned. Early in the disease a person may carry the poison from one part of his body to another by scratching. Very rarely one person infects another.

Prevention.—Is, of course, avoiding poison ivy and oak. Remember there is no certainty that because at one time you have handled these plants without injury the same will be true on another occasion.

Symptoms.—Are those of a severe inflammation of the skin. This appears on the exposed parts, usually the hands and the arms and face. The skin becomes much inflamed and swollen, blisters form and sometimes the inflammation is so severe that matter forms. There may be loss of the upper layers of the skin and a red weepy surface. The pain, itching and discomfort are severe.

Treatment.—If severe, a doctor should be consulted promptly. A very good and simple remedy is a wash of boracic acid solution in water followed by ordinary zinc ointment smeared on the inflamed skin. This should be covered with a thin cloth only, as a thicker one will cause heating. Lime water for the wash and carbolized vaselin for the ointment are fairly good. The ointment should be washed off daily with the wash, the inflamed skin dried and the ointment reapplied. In making the boracic acid solution, put enough in the water so that some deposits on the bottom, you cannot get too strong a solution. A good old country remedy is made by putting a cent in vinegar and using this wash frequently.

16. Mosquito Bites

These injuries are usually of slight importance, but it is well to remember that in certain places malaria is caused by the bites of mosquitoes, and that to prevent this disease mosquito nets and other means of protection against them should be used.

Ammonia, hartshorn, is the best remedy. The poison is an acid. Lime water with a couple of drops of carbolic acid to the ounce is also good. Menthol and talcum powder give some relief.

17. Chilblains

This common condition is caused by chilling of some part of the body and is most frequently seen in old people with poor circulation. The most common places for chilblains are the heel, toes, ears, nose and fingers.

In sensitive people, as it is due to cold, it may be prevented by warm clothing and frequent bathing of the part of the body affected in warm water, afterward drying it with soft towels.

Symptoms.—They are the well-known red appearance of the skin, which appears when the part is brought near the heat, especially in winter after being in the cold. There is considerable burning and itching.

Treatment.—Paint every two or three days with tincture of iodine pure or diluted with alcohol. Several coats of collodion at intervals of a few days are also good, as the collodion exerts considerable pressure on the dilated blood-vessels. If these measures fail, it is best to consult a physician, as chilblains are sometimes very difficult to cure.

18. Corns

Corns are of two kinds—hard and soft. The former occur at the sides of the toes and at the sides and bottoms of the feet. Soft corns form between the toes where the natural secretion makes the skin soft and pulpy. Both varieties of corns may be prevented by the most scrupulous cleanliness of the feet and stockings and by wearing well-fitting shoes which do not rub and so cause irritation of the skin which leads to the formation of a corn.

If a callus begins to form, rub the place gently with vaseline night and morning. Nitrate of silver stick will usually cause corns to disappear. An excellent corn remedy is one part of salicylic acid to three parts of simple cerate. Bathe and soak

the foot in hot water for twenty minutes, dry and apply ointment; cover corn with cotton.

Hard corns should never be cut, but should be rubbed down smooth with sandpaper after washing the skin. They should then be covered with a corn plaster or a piece of adhesive plaster. Cutting a corn, if you get below the hard skin of the corn, is likely to prove dangerous, as it often results in blood-poisoning.

Soft corns should be treated by careful washing and drying of the foot, especially between the toes, then dusting in a little talcum powder and keeping the toes separated by a small piece of gauze. A corn which has become inflamed requires treatment from a doctor on account of the danger of blood-poisoning.

19. Plant Poisons, Especially Mushrooms.

A number of the common plants are poisonous. Among them are Bitter Sweet, Deadly Night Shade, Mountain Ash, Hemlock Hellebore, Jamestown Weed, Wild Parsley and Lettuce and certain Mushrooms and Toadstools. Cases of poisoning, except from the last, are rare.

A rule which should always be observed is never to eat anything growing unless you are very sure that you know that it is not poisonous, and to prevent children from doing so.

Mushroom, sometimes called toadstool poisoning, is commonly due to failure to tell the poisonous from the non-poisonous varieties.

The rules which are commonly accepted for doing so are as follows:

Consider dangerous all mushrooms which have:

1. "A cup-like formation at the base of stem (so-called death cup)."
2. "A scaly or close-fitting layer at the base of the stem."
3. "Loose warts on the cap."
4. "A milky juice (unless this is red)."
5. "Great brittleness, with gills nearly all of equal length and the flesh of the cap thin."
6. "A honeycombed appearance of the gills, if the flesh

tastes bitter, or the mouths of the tubes are reddish, or the flesh changes color when cut or bruised."

7. "A cobwebby veil or ring when the plant is young."

8. "A slimy cap and clay-colored spores" (Dulles).

Moreover, all mushrooms that are decaying or are in the immature button stage should be discarded.

Symptoms of Poisoning from Growing Plants.—Nausea and vomiting. Severe pain in abdomen. Great depression. Unconsciousness, sometimes weak pulse, shallow respiration. Delirium from some poisons.

Treatment.—Send for doctor. Cause vomiting. Stimulants. Rest in lying-down position, with head low.

20. Home Medicines

While the first aider is supposed to make all possible use of material which she finds at hand anywhere there are certain articles which cannot be improvised. Especially in the home, perhaps, and even in a city with drug stores nearby it is wise to have a small supply of a few simple remedies and of surgical dressings. This is particularly the case with children in the household, as little people are so likely to hurt themselves and are much more liable to sudden illness than their elders.

Numbers of medicine cabinets are on the markets but in few, unfortunately, have the contents been selected with practical knowledge of the needs and limitations of the first aider. Some contain drugs which should never be prescribed except by a physician. This objection does not apply to the Red Cross Home Cabinet which has only the simple, safe remedies that are recommended in this book. There is no good reason, however, why anyone should not purchase her own supplies and make up her own cabinet. It is believed that all medical supplies should be put in some sort of a box as otherwise they will be lost and wasted and what is even more important cannot be found in time of need. Hanging cabinets are more convenient as by opening the door all the contents may be seen at a glance. They are, however, more difficult to make as cross partitions must be put in. It may, therefore, be better in some cases to use a box in

which the contents may be placed on the bottom with a view to putting it on a convenient shelf. Either a wooden or tin box may be used for the latter but if a hanging cabinet is to be made a wooden box will be found more suitable on account of the partitions. In any case the box had best be painted inside and out with white enamel paint. It is also better to provide a lock and key.

Do not make your medicine box too small, it is well to leave space for medicines prescribed by a doctor in illness so that they may be put away in a safe place. This does not mean, however, that medicines which have served their purpose should be kept. The sooner they are gotten rid of the better.

It is best to select a standard size of bottle. The two-ounce square bottle will generally be found most convenient. The few drugs which will be required in larger quantities may be put in two bottles.

The supplies suggested for the household medicine box are as follows:

Alcohol, 4 ounces.
Aromatic spirits of ammonia, 2 ounces (rubber cork).
Aqua ammonia—hartshorn—2 ounces, labeled "poison very irritating" (rubber cork).
Castor oil, 4 ounces.
Epson salts, 4 ounces (or half dozen Seidlitz powders).
Lime-water, 2 ounces.
Mustard, powdered, 2 ounces.
Syrup of ginger, 2 ounces.
Syrup of ipecac, 2 ounces.
Witch-hazel, 4 ounces.
Calomel tablets, one-tenth grain; small bottle (50–100 tablets).
Bismuth subnitrate tablets, 5 grain (100 tablets in bottle).
Carbolized vaselin or petrolatum, 1 tube.
Oil of cloves, 1 dram bottle (labeled "poison").
Soda mint tablets, 100 tablets in bottle.
Talcum powder, 1 tin.

Antiseptic gauze, 1 small package.
Absorbent cotton, ½ pound.
Roller bandages, gauze, 6, 3 large and 3 small.
First-aid outfits, Red Cross, 2.
Collodion; 1 small bottle with brush.
Tooth plasters, 1 box.
Corn plasters, 1 box.
Glass and spoon, 1 each or medicine glass, 1.
Scissors, 1 pair.
Pins, ordinary and safety.

QUESTIONS

1. What are the dangers of self-medication?
2. What are the dangers of patent medicines?
3. What are the commonest causes of colic?
4. How would you treat colic?
5. How would you treat diarrhea; constipation?
6. Treatment of nausea and vomiting?
7. Treatment of hiccough?
8. How would you treat chill from exposure to cold?
9. How would you know that a child had croup and how would you treat it?
10. How would you treat neuralgia of the face?
11. Treatment of tooth-ache?
12. Treatment of ear-ache?
13. How would you treat a stye?
14. How would you prevent and treat sunburn?
15. Treatment and prevention of prickly heat?
16. How would you recognize poison ivy and poison oak?
17. Treatment for ivy poisoning?
18. Treatment of mosquito bites?
19. What are chilblains due to and how would you prevent and treat them?
20. Prevention and treatment of corns?
21. What are the common poisonous plants?
22. Treatment of mushroom poisoning?

PRACTICAL EXERCISES

General review.

CHAPTER X

CARRYING AND HOME PREPARATIONS FOR SICK AND INJURED

1. Carrying. 2. Lifting into Bed. 3. Selection and Preparation of Room. 4. Selection and Preparation of Bed. 5. Removal of Clothing. 6. Position in Bed. 7. Preparations for Doctor.

Of course the object of the first aider is not only to give the necessary immediate treatment but to get sick and injured into the hands of a doctor in the best possible condition or, in case the services of a doctor are not needed, to their homes or to some other safe place. One of the most important things to be considered and determined also is whether or not a doctor is required. This question has, however, been discussed at length in connection with different injuries and will not again be referred to here.

It is clear that if one does not know what to do for a patient after his or her injury has been cared for the good from the best first-aid treatment may be largely or wholly undone.

1. Carrying

It will only be very rarely that it will be found necessary for women actually to carry patients. Still they should know how patients should be carried in order that they may direct the bearers.

Whatever method of transportation is adopted, first aid should be given before it is attempted and when necessary the clothing should be loosened so that it will not constrict the neck, chest or abdomen during transportation. Clothing should not be

removed, however, as this will increase shock and as patients almost always feel chilly as the result of shock they should, when possible, be covered with a blanket or rug.

All serious cases of illness or injury should be carried on stretchers when it is possible to procure or to make them and when in doubt as to the severity of an illness or injury it is always much safer to so carry a patient. The ordinary stretcher is so well known that it is hardly necessary to describe it. This stretcher has two long poles with a bed, usually of canvas, between them and cross-pieces to keep the long poles apart and thus to stretch the canvas. The poles are long enough to give the bearers handholds at each end of the stretcher. Fairly satisfactory stretchers may be made from materials which are usually easily procured. One of the easiest to make is the coat stretcher For this two coats and a pair of poles are required. The sleeves of the coats are first turned inside out and the coats are then placed on the ground with their lower edges touching each other. The poles are passed through the sleeves on each side, and the coats are buttoned and the buttoned side turned down. Two poles and a large blanket, rug or strong sheet may also be used to make a stretcher. The blanket, rug or sheet is spread on the ground and the poles are placed on the edges of the long sides. These edges are then rolled on the poles until a distance of about 20 inches, that necessary for the shoulders of the patient, is left between them. This stretcher may be turned over before being used and especially with narrow blankets, rugs or sheets it is much safer to bind them to the poles with twine. With both these stretchers, except when it is only necessary to go a short distance it is desirable to tie on two pieces of wood for cross-pieces so as to prevent the poles from being forced together when the weight of the patient is put on the stretcher. Bags and sacks may also be used for stretcher beds. The bottoms should be torn so that the poles may be passed through a number sufficient to give the length of stretcher bed required. These and similar stretchers should always be tested by lifting an uninjured man before they are used for the patient. Great care is also necessary to guard against accidents during transportation.

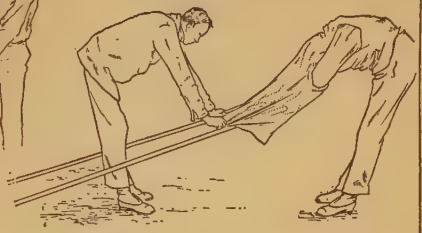
Numbers of other articles may be used for stretchers in case of necessity. Such articles are doors, window shutters, boards, bed-frames, benches, ladders, mattresses, blankets, rugs, sheets, and mats. It should be remembered, however, that these have a disadvantage over those which have been described above. The former, with care, require but two bearers, while for the latter four must always be employed. Four bearers, especially if they are untrained, can never work together as well as two, so with four bearers the patient will be jolted more with an increase of suffering and possibly further injury.

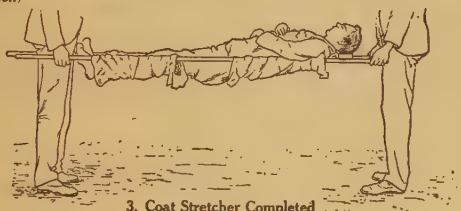
Whatever the kind of stretcher used, the greatest gentleness should be employed in putting the patient on it, in carrying, and in removing the patient when he has reached his destination. To effect this the bearers must work together in all these movements.

Four bearers are required. For them select strong, sturdy men of about equal height. They should be intelligent in order that they may understand your directions. Don't be afraid of spending a little time in explaining just what you want done, you will save in the end. First have one of the bearers bring the stretcher close to the patient but not so near that it will interfere with lifting him. The most convenient place for the stretcher will be about 2 feet from the patient's head in line with his body. Then have three bearers take position on one side of the patient and one on the other side. If the patient is not on his back the single bearer should be directed to put him in that position. Of course, it is understood that first-aid treatment has already been given. The proper places for the bearers are, the single bearer opposite the patient's hips, one of those on the other side also at the hips between the other two, one at the shoulder and one at the knees. At this time it will be well to explain no movements are ever to be made until you give the word. Now, have all four bearers facing the patient kneel on the knees nearest the patient's feet. Have the single bearer and the man opposite him pass their arms under the patient's back and thighs, the man at the shoulder puts one arm under the patient's shoulders and the other under his neck to the

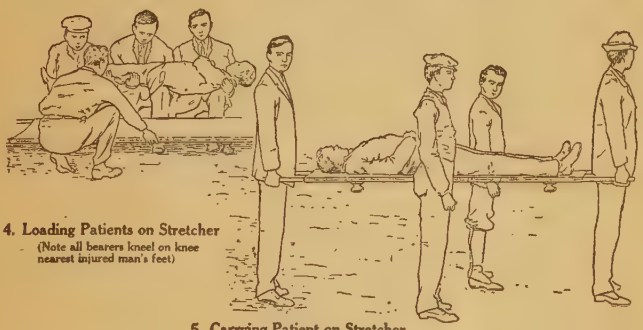
1. To Carry in Chair (Convenient for Women)

2. Making Coat Stretcher by Stretching Coat over Head onto two Poles





3. Coat Stretcher Completed



4. Loading Patients on Stretcher
(Note all bearers kneel on knee nearest injured man's feet)

5. Carrying Patient on Stretcher

PLATE XVIII.—Transportation.

further shoulder so as to support the head, at the same time the man at the knees places both arms under the legs. Ask the bearers if they are ready and then say "Lift." Then the bearers must all lift together and place the patient on the knees of the three bearers who are in line. These, of course, form a firm bench. As soon as the patient is safely in position, the single bearer should be told to leave him and to get the stretcher and put it under him against the other bearers' ankles. The single bearer should then put his arms under the patient's back and thighs as before. Ask again if the bearers are ready and give the word "Lower." The patient is then gently lowered to the stretcher.

Next, have one bearer take position between the stretcher handles at the front and another at the rear. Direct them to stoop and to take hold of the handles but not to lift until you give the word "Lift." Then they rise and stand erect. They should not move forward, however, till the word "March" is given. Then the one at the front steps off with his left foot and the bearer at the rear with his right foot so as to break step. This will jolt the stretcher much less than though the bearers are in step and if they take short steps instead of long ones this will help in the same way. Always carry the patient feet first except when going up a hill or upstairs when he should be carried head first, the streatcher being kept as level as possible. The two bearers who are not carrying the stretcher march at its sides to give any needed assistance and, of course, finally to help remove the patient. The motions are reversed in removing a patient from a stretcher.

When four bearers must be employed everything is done in the same way except that four instead of two men carry the stretcher.

Generally speaking, the bearers should take the shortest course in carrying the patient to his destination, but it is much better to go around all obstacles than over them as this will jolt the patient less.

Explain to the bearers further that you will tell them where you wish them to stop; but after doing this they are not to lower the

stretcher until you give the word "Lower." Then the stretcher should be gently lowered to the ground.

As explained above, in carrying a patient upstairs or uphill he should go head and not feet first. To do this without confusion it will be best to stop the stretcher at the foot of the hill or of the stairs, as the case may be, and to lower it to the ground. Then have the bearers face in the opposite direction, lift the stretcher, turn it around slowly and then go up the hill or stairs.

Of course, the position of the patient on the stretcher should be such that his particular injury will receive no further hurt. Usually it will be best to make a pillow from a folded coat but if the patient is very faint or has lost a great deal of blood he is safer without the pillow.

A convenient method of carrying a patient without a stretcher is to seat her, and this is particularly well adapted for women, in a strong chair and have two bearers lift the chair, one at the front and the other at the rear. The chair should be inclined backward so that the patient is almost in the lying-down position.

A patient able to sit up and steady himself by placing his arms around the bearers' necks may be carried in the "Lady's Chair." To form this each bearer should grasp his left wrist in his right hand and the other bearer's right wrist in his left hand with the knuckles uppermost. The bearers then stoop and place the "chair" under the sitting patient who steadies himself by placing his arms around their necks.

2. Lifting into Bed

It is somewhat easier to do this with a narrow bed as with this bearers can work on both sides in lifting, carrying, and lowering the patient. With a narrow bed have the loaded stretcher, patient carried head first, brought to the foot of the bed and in line with it. Then have the bearers raise the patient on their knees just as though they were going to lower him to the ground. After the single bearer has removed the stretcher he will, of course, return to assist with the patient. When his arms are in position to do this, the word "Rise" should be given, then the

bearers all supporting the patient will rise to their feet and carry the patient to the bed, side stepping on each side, thus passing the patient over the foot-board. When in proper position the patient should be gently lowered to the bed and the bearers remove their arms.

If the bed is too wide for this method to be adopted or if there is no space to place the stretcher in line with the bed at its foot a slightly different plan must be followed. For this the loaded stretcher is placed at the side of the bed and the patient is raised in exactly the same way, the stretcher, of course, being taken out of the way. After the single bearer has assisted in raising the patient, however, he steps to one side and the other three bearers carry the patient forward over the side of the bed.

3. Selection and Preparation of Room

Generally speaking the patient's own room is best. This is because he will usually be better contented there and will not worry himself by desiring a change, a matter of some importance in serious disease or illness. In severe injury, however, it may not be possible to take a person to his own room on account of the difficulties presented by narrow passage-ways or steep stairs. The room selected must, of course, be free from these objections but, if possible, it should not be a ground-floor room, as such rooms are likely to prove noisy and do not afford the privacy desirable for persons in serious condition. In illness, if the patient's own room is unsuitable for some good reason, it is best to choose a room as far separated as practicable from other members of the family. This is particularly the case in contagious diseases when the well should never be endangered by the sick if it can possibly be prevented. A room on the upper floor is better for such cases for two reasons. Well people are less likely to enter it and all the currents of air in a house are upward. A toilet nearby will save many steps in serious illness or injury and will also be safer in cases of contagious disease.

If the patient must be carried to his sick room on a stretcher, the way to it should be cleared previously by removing furniture and loose rugs over which the bearers might trip.

All useless articles should be removed from the sick room. These include furniture, clothing and hangings, also most if not all of the pictures from the walls. Judgment must be shown in doing this, however. Persons not seriously ill or injured will enjoy having their belongings about them. This is not the case if the condition of the patient is serious and everything useless makes more work. Moreover, the delirious brain is likely to twist almost everything into some horrible shape. The furniture of the room in contagious disease should consist of the bed, a small plain table, two chairs without upholstery and the window shades. In preparing the sick room be particularly careful not to stir up the dust.

The room should not be dark but the shades should be so arranged as to exclude the glare of the sun.

4. Selection and Preparation of Bed

A narrow, high bed is to be preferred and should always be used if available. In the first place it is easier to lift a patient into a narrow bed and in the second he is much more easy to care for in such a bed. If it is high in addition much stooping over is saved. The bed should be drawn out from the wall so that it may be easily reached from all sides.

A firm mattress is much the best. Two fairly hard pillows should also be provided. The lower sheet should be smooth and it had best be kept so by safety pins at the sides of the mattress. Over this in serious illness or injury a draw sheet should be placed. This is an ordinary sheet so folded lengthwise that it will extend from the middle of the patient's back to his knees. It should be pinned in place like the lower sheet. While it may be necessary to put a piece of rubber sheeting under the draw sheet in order to protect the bed do not use this unless it is really needed as it is likely to prove hot and uncomfortable. The top covering should consist of a sheet and ordinarily of a double blanket. The upper covering should be turned well back. Extra sheets and blankets should be ready at hand. It is well to have hot-water bottles and hot blankets ready, espe-

cially for injured for there is likely to be a great deal of shock. If they are used to heat the bed the covers must, of course, not be turned back till immediately before the patient is put in bed.

Special preparations are often necessary for fractures of the thigh and leg. Two or three boards are sometimes put under the mattress to prevent bending of the bone at the place it is broken. Bed cradles, as they are called, are also used to support the weight of the bed clothes. A band-box with a hole cut through for the leg or a stool are sometimes used for this purpose or a piece of twine may be run through the bed covers and tied to the foot of the bed or to a nail in the wall.

When there has been a great deal of blood lost it may be necessary to raise the foot of the bed. A couple of soap boxes will answer well for this.

5. Removal of Clothing

Something has already been said on this subject but it will perhaps be better to repeat this in part here. The principle which should govern our actions in this respect is to think first of the patient and second of his clothes. In serious cases clothes should be cut freely rather than to run risk of further injury by trying to take them off. In ripping up a seam in clothing always take the seam which can be most easily reached. For example, with the trousers the outside seam should be ripped. In undressing always draw out the uninjured limb first, but in dressing, dress the injured limb first.

In burns probably, most damage may be done if care is not taken in respect to the clothing. Never drag the clothing off a burn or scald. Cut off all you can with a sharp pair of scissors and soak what remains with oil. Of course, the attention of the doctor should be called to this as soon as he arrives.

In injuries, the clothing is likely to be very dirty and it should be removed before the patient is put into the clean bed. For this purpose he may be placed for the time being on another bed, a lounge or a table. To prevent soiling them they should be covered with newspapers and old sheets, or several thicknesses

of newspapers alone do very well. If it is absolutely necessary to use the patient's bed it should be protected from dirt in the same way.

6. Position in Bed

This is governed, of course, by the same general principles which have been noted elsewhere. That is to say, if the patient is pale or feels faint or has lost much blood do not give him a pillow but make him lie flat. It is in such cases that the foot of the bed should be raised.

When the patient's face is red raise his head on a pillow.

7. Preparations for Doctor

The first thing to make sure of is that the doctor will come with sufficient knowledge of the condition of the patient to bring whatever may be necessary and thus to save valuable time. In this connection we are, of course, considering injuries especially and not diseases. Communication with the doctor by telephone is best as this will enable him to make necessary inquiries, If this is not practicable send a written message. However you communicate with the doctor try to be as clear in your statements as possible.

Very probably if you talk to the doctor over the telephone he will tell exactly what preparations he wants made. Then all responsibility is off your shoulders if you carry out his directions to the letter and this should, of course, always be done. Suppose, however, preparations are left to your own good judgment. Remember, first, that there will probably have to be an examination of the patient so the room should be warm in order not to increase shock from chilling of his body. If there is a serious wound for which you think some kind of an operation will have to be performed it will save a great deal of time if you will get a room ready for this. In the first place you want a good light, a north light if possible. Then you will require a table. An ordinary kitchen table well scrubbed with soap and water will

do very well. Another small table will be needed for dressings, etc. It is better not to try to clean the room you have selected for an operating room as this will stir up the dust. On the contrary leave it strictly alone and do not allow people to enter it for this will raise the dust. If the doctor wants anything special done to the room his wishes may be carried out while he is preparing for the operation.

When an operation will probably be required you will need plenty of hot and cold water and the greater part of this should have been boiled for ten minutes so you must start boiling water as soon as possible. Do not remove that which has been boiled from the vessels containing it but put aside the greater part of it to cool in them as soon as it has boiled ten minutes. You will also need several basins. After making them perfectly clean they should be rinsed out with boiling water and not wiped but put aside for use just as they are. At least a dozen clean towels, and soap should also be provided. A pail or slop bucket will answer well enough for the waste water.

The preparations for a large dressing are about the same as for an operation. When smaller wounds required dressing this may often be done in the patient's bed. The preparations in other respects should be the same and some kind of waterproof cloth should be provided to protect the bed. Except in the cases mentioned it will hardly be worth while to make special preparations for the doctor's first visit unless he directs that this be done. For later visits you will learn from him just what will be required.

QUESTIONS

1. Show what you would do and say if you were called upon to direct four men to carry an injured person on a stretcher.

2. How would you have an injured person carried up stairs?

3. How should a person be lifted from a stretcher to a bed?

4. What points would you take into account in selecting a sick room?

5. What sort of a bed would you choose and how would you get it ready for a patient?

7. How would you remove the clothing from a seriously injured person?

8. In what position should the patient be put in bed?

10. What sort of a message would you send to a doctor if an injured person had been brought to your home?

11. What preparations should you make before the arrival of the doctor?

PRACTICAL EXERCISES

Practice in carrying a patient. This may actually be done if you have a light boy for a subject but in any event the necessary motions may be satisfactorily demonstrated. When practical the preparation of the bed and lifting the patient into it should also be demonstrated.

The best exercise will be to describe some injury and to tell the members of the class to do everything necessary till the patient is in bed.

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